

The Arrival of the Fittest.

Dr. Wm. Taggart's Wonderful Gold Inlay Method.

Let the chroniclers of dental events set down January 15, 1907, as one of the most important dates in the annals of our art. On the evening of that day, a large audience of prominent men from several States attended a meeting of the Odontological Society of New York eager to hear an essay by Dr. Wm. Taggart of Chicago. Eager, because while not half a dozen men really knew what was to occur, Dame Rumor had busily wagged her tongue, and anticipation ran high, but, as it proved, not so high as did realization.

In the afternoon of the same day, in the laboratory of Dr. M. L. Rhein, Dr. Taggart demonstrated his method before a very few, who had been asked to discuss the paper, and who, therefore, were admitted to this private clinic, that they might the more intelligently express an opinion when called upon during the evening. Those who were fortunate enough to be present, will long remember the occasion, and especially the moment when, for the first time before onlookers, Dr. Taggart made the cast, and produced a perfect gold inlay, of pure gold. There was a spontaneous outburst of applause, which, coming from so small a body of men, was most impressive. But it is not strange that they were impelled to this demonstration, for every man felt that he had seen an alchemist at work.

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The Taggart Inlay.

The Taggart inlay differs from all others in two essential particulars. It is made of pure gold, and no preliminary matrix is needed. Another departure from previous methods lies in the fact that neither impression of the cavity nor model is required, though in an extreme case such preliminary model may prove a convenience.

The Taggart method is as follows: A specially prepared wax is utilized. The exact formula for this wax has not as yet been given, but it is, in the main, a combination of wax and paraffine, which is refined by straining twice through a filtering paper. This precaution removes all foreign particles and renders the material absolutely meltable.

With this special wax the original model of the inlay is constructed. In plainer terms, Dr. Taggart fills the cavity with wax, making his wax conform exactly to the shape required of the finished gold inlay. Where occlusal surfaces are involved, the wax is forced into the cavity, and the patient told to close his mouth, thus assuring the proper "bite." All excess of wax is then carefully cut away, and the remainder carved into perfect occlusal and approximal contour and relation. The approximal surface is perfected by polishing with thin tape and vaseline. In a great degree the final success of the inlay depends upon the care and skill expended upon the wax, because, so accurate is Dr. Taggart's casting method, that the gold assumes precisely the form of the wax, be it good or bad.

When the wax inlay, so to speak, is perfected, a sprue former, a small bar of brass about the size of No. 16 wire, is attached at a convenient point to the wax, by slightly heating it. Thus the wax is made to adhere to one end of this sprue former, while the other end is set into a hole in the cover of his flask. The next step is the investment.

Method of Investing the Wax Inlay.

The investment is made with Peck's investing material, though other finely ground investments will serve. The powder must be mixed so as to avoid bubbles.

It is consequently slowly sifted into the water until the proper consistence is obtained. The wax is covered with the investment very carefully, the tiniest spatula serving to carry just a little of the material to place at a time, after which it is coaxed all around the wax until the latter is completely hidden in a ball-like mass. This is then put aside for a moment to slightly set. The ring of the flask proper is then placed over this invested wax, which rests, be it remembered, on the sprue former which is set in the flask cover. The ring in place, more investment is poured in, thus filling the flask.

When the investment has sufficiently set, the flask is placed over a Bunsen flame for further drying and heating up, with the result that

the wax is melted, passing into the investment. Thus we have a disappearing model. The melting of the wax likewise enables the operator to remove the flask cover which brings with it the sprue former which had been attached to the wax; and the withdrawal of this bar leaves a hole leading down to the mold of the inlay which is now empty, the wax having been absorbed.

**Method of
Casting the
Taggart Inlay.**

The cover of the flask is also so fashioned that its removal leaves a cup-shaped depression in the investment at the center of which is the hole which leads to the mold. Thus a crucible is supplied into which the ingot of gold may be placed. The flask with this lump of gold is then placed into Dr. Taggart's casting apparatus, and the flame of an oxy-hydrogen blow-pipe turned directly upon the ingot, playing from above downward. The gold is watched until it is not merely melted, but actually boiling, at which temperature it is as fluid as water. At this precise moment a lever is pushed down which instantly accomplishes three things; the blow-pipe arm and flame is turned to one side; the flask is closed with a cover lined with asbestos; and finally thirty pounds of compressed air is brought against the molten mass, thus making the cast under this heavy pressure. The entire procedure, as above described, occupied Dr. Taggart, at his clinic, only twenty-nine minutes.

**The Perfect
Result.**

The inlays resulting from this method are marvelous. The adaptation is so accurate that there is no doubt but that Dr. Taggart has found a means by which the shrinkage of the metal is entirely overcome. Of course the shrinkage of high grade metals is not great, but by this process alloyed golds and even base metals may be cast with equal accuracy.

A remarkable test of the possibilities of the method was a specimen shown at the meeting. This was a small gold plate having two clasps, the whole cast, in a single piece, of clasp-gold. Another admirable specimen was an inlay for four teeth accurately fitting the occlusal surfaces, carrying ten or twelve pins for retention, and perfectly restoring occlusal relations with the opposing jaw. All was made in a single casting.

Dr. Taggart's paper will be published in due season, when his method will be better described in his own language. This is but a brief report of an important meeting; "an occasion," to quote from one auditor, a very prominent practitioner, "more noteworthy than any since Barnum gave us the rubber dam." In brief, we merely wish to promptly notify our readers of what we have chosen to denominate the "Arrival of the Fittest," and to prophesy of the Taggart inlay that it will likewise prove to be the "survival of the fittest."



A Plea for Purer Ethics in Dentistry.

BY KENNETH McDOUGALL, D.D.S., Brooklyn, N. Y.

"Sound knowledge, simple aims, mastered craft, vivid intentions, strong common sense and eternally true and wise meaning."

John Ruskin's list of the merits of Greek Art have been placed at the head of this short article as a sort of motto to draw attention to the fact that not alone in Greek Art, but along the lines of all good work in every department the same laws obtain. Sound knowledge and mastered craft in our own profession are indissolubly linked with vivid intention, simple aims, strong common sense and eternally true and wise meaning; and these last comprise in large part, if not altogether, the ethics of dentistry. It is no less true now than it always has been that ignorance is the foe of real success, yet a man may have mastered his craft and be blindly ignorant of the "rightness and oughtness," which goes along with it. From this we would agree that there should be a higher standard of excellence as to the principles at the foundation of the right regulation of conduct.

We have appliances and methods far in advance of our ethical code. The question of means for restraining or abolishing the so-called advertising dentist has taken up some of the time and attention of our societies of late and it is a question for discussion. If the profession as a body is concerned as to the welfare of the public in this matter, proper steps might be taken at once to notify and warn them of their danger. If, on the other hand, it has simply its own commercial interest at heart, the matter may safely rest with the laws that govern the survival of the fittest, and comfort may be found in the thought that time and a discriminating public will render a verdict that must satisfy all concerned.

A danger fully as great threatens us in the self advertiser. Pure ethics should bear the same relation or position to our profession that a health officer does to a large port, and should be the means of stamping out and obliterating self advertisement and charlatanism in their many disguises by a strict interpretation of the laws that should, but often fail to govern one of the most important branches of the science of dentistry.

The young practitioner looking down the narrow pathway of correct ethics perhaps does not see the prompt pecuniary rewards awaiting him that he so plainly discerns in the broad road of the advertiser, and just entering the portal of the profession, perhaps not thoroughly equipped with a share of this world's goods, fails to keep before him a high and true standard, resting satisfied with a success that is only

ephemeral. The ingenuity of the self advertiser in private practice is often marvelous, and his fertility of resource phenomenal. His existence is brought to the notice of the public by himself in ways that would do credit to the greatest press agent of the day. The work, the caution required in dodging the censure of his colleagues, takes time. Should this same energy be expended in scientific research, and in the shaping and broadening of his professional life, how much greater would be his chances for permanent success. The foundation so laid would be a lasting tribute to his normal sense with reference to himself and the public.

Closely allied to this evil and existing as a disintegrating force we find petty professional jealousies and a lack of confidence toward one another, arising often from the misinterpretation of the attitude of others toward ourselves. Happy is the man who has no time for such a state of mind.

The deans of our profession err, perhaps, in not laying sufficient stress on the desirableness of a closer tie to bind dentists together. We must work together for our own good; to do this we must agree upon ethical laws and act in harmony with them. This offers the best basis of union in societies and insures the most cordial relations, and in no way interferes with differences of opinion with regard to methods, nor with independent thought and judgment. Some one has said that "Highest among the ethical virtues are justice and righteousness." We need not challenge this statement, but assume it to be true. Our profession to-day suffers not a little from overcrowding, but more, possibly, from the intense greed as to the intrinsic rewards the practice of dentistry offers. It is difficult to connect the relative fee a man may charge for his professional services with the subject of ethics. The only apparent relation is that which conscience establishes, which is the guide and only dictator we have in the fulfilling of the laws laid down for us in the ethical code prescribed by colleges and State societies. "An honest quid pro quo" is a good motto here, and should be at the head of every man's ledger, to be the text of every outgoing bill.

The most thoughtful student of our ethical laws, finds that society with her powerful levers, her unwritten laws, plays a most important part in the elevating of that standard by which our profession must be kept purer.

The public will not be deceived by mere outside show of glittering generalities. It demands for its patients, at the hands of our dentists, the best and most thorough work, the latest methods, the best appliances with furnished appointments as to the office. But more, it requires that the dentist shall be a gentleman of reasonable mental caliber, and above all, and beyond all, a man of moral integrity.

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If there seems to be a platitudinous note in all this let us remember we have not too many good examples set before us and reiteration seems not out of place, and if there is a better way to set forth the importance of these truths by all means let us have it. There are bright and shining lights in our own profession as we all know and it is well to note the foundation on which they build. When we do see a young man proceeding with patience, and in a serene and contemplative spirit in pursuance of a lofty ideal, we watch his career with a feeling of appreciation and admiration. This true student of ethics you will observe makes deliberate but steady progress, impressing not only the profession but the public. His career is not meteoric, his entrance into the hall of fame is not abrupt. He has mastered his craft and holds a position rightly his, fairly earned, a glorious triumph.

A paper on professional status read by its author, Doctor J. E. Nyman, of Chicago, before the Connecticut State Society some time ago, is perhaps the most complete essay of its kind ever given to the profession.

Seeds of ethical culture, however, should be sown in the colleges. The young graduate should enter the arena teeming with enthusiasm for higher standards, but how often to-day is this the case?

We have in all of our societies a committee on ethics, and indeed its need is obvious. Seldom, however, do we hear of its action, for the simple reason that ethical laws are so universally violated that no comment is found necessary, no censure apparently needed. We shall stand in the shadow of our brother professions just so long as we refuse to recognize quality, higher aims, superior knowledge and the cultivation of ethics.





Nasal Obstruction and Malocclusion of the Teeth.

BY DR. B. FRANK GRAY, Colorado Springs, Colo.

Read before the Colorado State Dental Association, Denver, June, 1906.

It is the writer's purpose to interest if possible the dentist and the rhinologist as well as the general practitioner of medicine in the malocclusion of the teeth which so frequently accompanies nasal obstruction.

Whether obstruction of these air passages be brought about from such causes as an hypertrophy of the pharyngeal tonsil, acute rhinitis, polypoid growths, enlarged turbinates, or other causes, the result will be that the passage of air to and from the lungs will essentially be through the oral cavity, the extent of the perversion being in proportion to the nasal occlusion. So that aside from any consideration of its dental significance there is enough of interest in the matter to enlist the serious thought of physicians. The mouth was never intended to perform the functions of the nose in the act of breathing. The nasal passages with the accessory sinuses, like all the organs of the human body, are particularly well adapted for the work which they were intended to do. Before passing to the lungs it is nature's purpose that the air be properly warmed; also the secretion of the mucous glands of the nasal passages not only has an influence in moistening the air to the necessary extent but this secretion may catch and hold in suspension particles of dust inhaled in the air which might otherwise pass on to the injury of the individual. It is claimed by some that this secretion has a germicidal action as well.

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The untoward influence on the growth and development of the child in cases of the type now being considered is well recognized, such children often being undersized and anemic, and having a characteristic expression of dullness. The open mouth and malocclusion of the teeth comprise the most noticeable diagnostic features in extreme cases and these are a real deformity, and in some cases the condition approaches what might be termed a monstrosity. It is little wonder that some of our early writers on the subject should have believed these patients to be degenerates, a theory that has happily lost in its following pretty generally.

It is not, however, the province of this paper to deal with the many different and important phases of these conditions minutely: there are men in the country who have been giving the matter long and careful study and who have collected much valuable data and we shall ere long hear from them I trust. Their contributions will be awaited with much interest.

Dr. Bogue, of New York city, in a paper read at Leicester, England, in July of last year, made the following statements: "I find by an examination of many hundreds of aboriginal skulls, in the development of which nature has been free to work her will without the assistance of man and where the so-called accidents of development occurred as they do with us civilized races though probably not with the same frequency, that in all those cases where irregularities in the development and positions of the upper teeth exist there are also irregularities more or less strongly marked in the development of the maxillæ and the palate bones and seemingly in the vomer, the sphenoid and ethmoid as well, and that the nasal septum particularly is sure to be crooked, and the turbinated bones so excessively curved as to materially interfere with the proper openings of the nasal meatus. . . . Per contra by just so much as the permanent teeth are regular in their development, and are regularly placed in their arches, all the sinuses of the maxillæ and facial bones are better developed, the nasal septum becomes straighter, the turbinated bones less obstructive, the sphenoid and ethmoid larger proportionately to the size of the skull and the facial bones occupy positions that add the dignity of strength to the individual."

Along the same line of thought, Dr. Herbert A. Pullen, of Buffalo, in a paper read before the N. Y. State Dental Society last month, speaks as follows: "Defective development of bones of the face and head and other parts of the body are noticeable as the result of mouth-breathing; the lower thoracic walls are sometimes contracted in the region of the true ribs, due perhaps to the fact that the inspiratory tension of the diaphragm is not compensated for want of the amount of air necessary to distend the inferior portions of the lungs, the pull of the muscles caus-

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ing retraction of the ribs, which in children are soft and yielding and sometimes rachitic."

It is along these lines of investigation that we are all particularly interested.

Again, Doctor Angle, whose ripe experience in orthodontia entitles him to a most careful hearing, has said: "With normal nasal respiration and normal relation of the dental arches, teeth and muscles the conditions are such as to perfectly maintain the equilibrium and the mutual support necessary to the normal development of the teeth and jaws. Nasal obstruction disturbs the equilibrium, placing the lips and muscles on a different tension, causing greater pressure of the muscles at some points than at others."

Duty of the Dentist.

Dentists may be able to readily recognize cases in which nasal obstruction plays a part, particularly if the obstruction has attained extensive proportions.

In most cases the diagnostic features already hinted at will probably be borne in mind but the irregularity of the teeth which is so often an accompaniment of these conditions may be the first thing to attract the attention. This malocclusion itself, of course, requires treatment and either the dentist or the orthodontist who may suspect some nasal obstruction ought to refer the patient to a competent rhinologist for examination and treatment if necessary. In the case of the dentist, the health and consequent well-being of the child is dependent upon his ability to recognize the condition and wisely advise in the matter. The same may be said of the orthodontist, and I would refer to the further fact that the success of his treatment of the malocclusion is very often dependent upon the patient's receiving efficient attention at the hands of the rhinologist, for he may correct the malocclusion to the best of his ability, and with every apparent success, only to suffer the chagrin and mortification of seeing the teeth revert to their old positions unless the nasal occlusion be cured. Indeed, in this event, are not the same influences which produced the malocclusion originally still operative to cause its recurrence?

Duty of the Rhinologist.

On the other hand what ought to be the attitude of the rhinologist in these cases? To him probably the largest number of patients suffering from nasal obstructions present themselves for treatment, and to his skill should be credited the alleviation of an immense amount of suffering. So, to the rhinologist also, it seems to me there should be opening up a most interesting field of observation and investigation, for he has every facility for noting the condition of the nasal passages with the accessory sinuses and he may readily observe the harmony or inharmony of

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the teeth. The habit of recording in the history of each case the condition of the teeth as to their occlusion or malocclusion might not only be of benefit to him in his own work but it would certainly help the orthodontist and to the rhinologist and the orthodontist there is much of common interest. If the latter relies upon the skill of the former to help make his work a success what about the reverse? I think I may safely say that while the rhinologist does alleviate much suffering he may not always hope to have his patient thoroughly cured until the malocclusion of the teeth is corrected. As an instance I would cite the case of the habitual mouth breather, in whom irregularity of the teeth actually prohibits any possibility of the normal closure of the lips. Is it at all likely that such a patient will at once become a normal breather after the removal of the nasal obstruction? I believe the old habit of mouth breath-

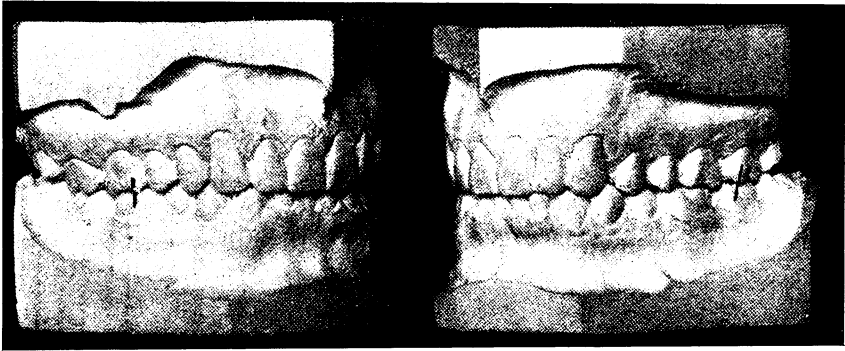


Fig. 1

ing persists rather stubbornly in many cases after such treatment, even when the malocclusion may not be a positive barrier. It is evident then, where there is inability to close the lips, that the work necessary to the patient's welfare is but partly done.

In eighteen hundred and thirty nine, sixty-seven years ago now, Dr. Chapin A. Harris commented as follows: "Sometimes the superior maxillary arch is so much contracted and the front teeth in consequence so much projected that the upper lip is prevented from covering them. Cases of this kind, however, are of rare occurrence and when they do occur they occasion much deformity of the face, and are a species of irregularity very difficult to remedy." This observation is true of these conditions as they exist to-day with the exception that the rarity of their occurrence is not so great, and their correction being now so much better understood is accomplished in a manner most gratifying.

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Diagnostic Value of Occlusion.

At this point I may say a word as to what comprises the normal occlusion of the teeth, and by way of illustration I refer to Fig. 1. It will be noted that the anterior, or mesio-buccal cusp of the first molar tooth of the upper arch occludes between the anterior and posterior cusps of the lower first molar; or more properly speaking, in the buccal groove. While it is true that with the molar teeth in this normal arrangement the anterior teeth may be badly malposed it is a significant fact that in the case of patients suffering from nasal obstruction the molar teeth are very prone to become disarranged.

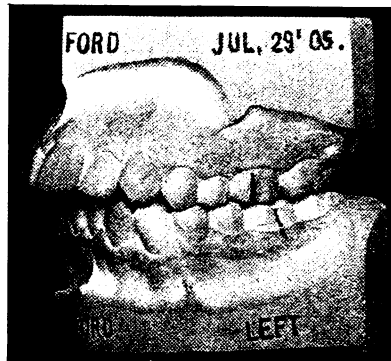


Fig. 2.

In such cases the first permanent molar of the lower arch erupting at approximately six years of age is apt to assume a position distal to normal amounting eventually to the width of one cusp. Such a malocclusion is shown in Fig. 2.

In order to explain how this distal relation of the lower molar with its attendant malocclusion is brought about you are asked to picture to yourself a child we will say six years of age in which the nasal passages are so occluded that mouth breathing is a necessity. With the mouth being held open almost constantly the tendency is for the mandible to assume a position slightly distal to normal: now bearing in mind that the upper and lower first permanent molar teeth are approaching each other in the process of eruption it is not difficult to understand how readily the lower molar will assume a position of distal occlusion as shown in the illustration. As soon as the normal influence of the inclined planes of the cusp is lost, the eventual displacement to the extent of the full width of a cusp is assured.

The distal relation of the lower molar however is only the commencement of the deformity, for with the beginning of mouth breathing

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the normal force of the muscles is perverted, the anterior teeth no longer being hindered from protrusion and the tendency of the upper arch to assume what is known as the "V-shape" being brought about by the abnormal pull of the exterior muscles and as well, I believe, by the absence of the normal pressure of the tongue lying, as it must, on the floor of the mouth with the air current passing above. In short all is out of harmony, all out of normal balance.



Fig. 3



Fig. 4

I would suggest that such cases are probably very progressive, the deformity increasing until the patient reaches maturity. The comparative ease of treatment during early life and the greater measure of success attendant thereon at that period are sufficient reasons for prompt action in combating these distressing conditions. However, some wonderful results are being accomplished in mature cases. Dr. L. P. Bethel, of Columbus, Ohio, has reported the case of a patient, a boy thirteen years of age, who was a mouth breather. Lower teeth in distal relation and upper incisors protruding in the characteristic manner. This patient suffered from the unfortunate habit of stammering, and after the use of the Baker anchorage six or eight months in treating the malocclusion this habit was largely corrected. At the end of fifteen or sixteen months'

time, which was required in the treatment because of complications, the boy was free from any impairment of speech. This is interesting and as Dr. Bethel suggests opens up a line of investigation as to whether malocclusion of this character is a causative factor in impairment of the speech.

A Case from Practice.

The photographs shown (Figs. 3, 4, 5, and 6), illustrate the unfortunate condition of a boy twelve years of age. I am now treating the malocclusion in this case. Adenoids were removed over a year ago. The rhinologist who recently examined the patient at the com-



Fig. 5

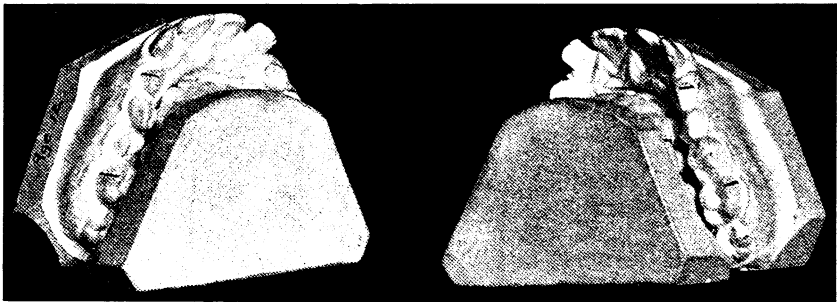


Fig. 6

mencement of my treatment of the case reports that the adenoid condition still persists but not to an extent which would have any perceptible effect on normal breathing. The malocclusion is in some respects of the most pronounced kind I have ever seen and while the superior arch has not assumed the "V-shape" so common, the distal relation of the lower teeth was undoubtedly brought about because of nasal obstruction. There is scarcely any articulation of the teeth to say nothing of occlusion: in fact with the exception of the molar teeth on one side there is absolutely no contact of the teeth at all. This patient is still a mouth breather,

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Fig. 7



Fig. 8

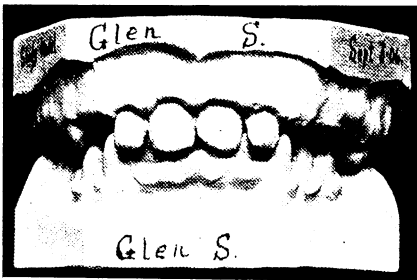


Fig. 9

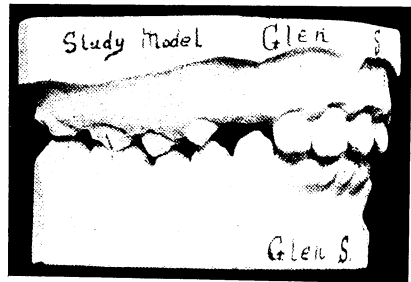


Fig. 10

and I believe he would continue to be so so long as his teeth remained as I found them a few weeks ago. The lips do not close, except by effort. Having so recently started treatment of this patient I shall have to wait some time before reporting results, of which, however, I am sanguine.

NOTE.—The publication of this paper having been considerably delayed I am enabled to illustrate in Figs. 7, 8, 9, and 10, made from photographs of study models, and of the patient, the very gratifying progress made in three months' treatment. The case will be fully reported later on.

Dr. Hawley of Columbus, Ohio, reports as follows with reference to two cases. Case I: Boy aged ten years; character of nasal obstruction, adenoids, which were removed at nine years of age. In six months treatment of the malocclusion, the arch was expanded 35-100 of an inch. The health and breathing capacity were greatly improved. In fact this patient could never sleep with the mouth closed until after treatment. This case was completed one year ago, and is reported to be still improving.

Case II is that of a girl, aged seven. This is one of the cases where the patient suffered from adenoids and abnormal breathing, although the normal relation of the molar teeth was not disturbed, as so commonly happens in patients of this type. The doctor reports this as a Class I case. Adenoids were removed one year before treatment of the



Fig. 11

malocclusion. Treatment covered a period of four months. Arch was expanded 30-100 of an inch. Perfect nasal breathing was never established until after treatment of the malocclusion.

Dr. Hawley reports further, that out of twenty cases taken at random from his collection of models eighteen have a history of some nasal or throat obstruction.

Dr. Frederick S. McKay, of the Angle School of Orthodontia, states that out of sixty-six cases examined, twenty-one have undoubtedly had their origin or at least been influenced by some form of nasal obstruction, probably adenoids. Six of these cases presented malocclusion of Class I type, and the remaining fifteen of Division I, Class 2.

Dr. Martin Dewey, of Kansas City, who also has a connection with Dr. Angle's school, has very kindly given me data concerning two interesting cases. The first is of a girl aged nine. The rhinologist found she was suffering from adenoids, which were removed at the commencement of treatment of the malocclusion. The general health was improved, as well as the breathing. Mouth breathing causing so much deformity of the arch, this deformity must be cured as well as the nasal obstruction before the patient can again become a normal breather.

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Fig. 12



Fig. 13
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The case which follows, also reported by Dr. Dewey, is that of a young man twenty-four years of age. The typical Division 1, Class 2, type of malocclusion is here presented. See Figs. 11, 12, and 13. The molar teeth are in the same relative positions in this case as in the one just referred to, but the facial deformity is much more excessive. Doubtless the inharmony of features in the former case would eventually have been as great as in the latter, as Dr. Dewey has suggested, had treatment not intervened. In the case of the young man, while there was no nasal obstruction at the time of treatment he was nevertheless a mouth breather for reasons which are apparent and which I have already mentioned. The patient undoubtedly did suffer from nasal obstruction at an earlier time of life and the malocclusion had its inception at that time. In only three months time this deformity was corrected, and a further result was normal breathing, and an improvement in speech.

Dr. A. R. Solenberger, of Colorado Springs, in commenting upon the subject-matter of this paper, stated as follows: "I am convinced that in the larger number of advanced cases of nasal obstruction, and consequent mouth breathers, there is sufficient malposition of the superior maxilla (including teeth, of course,) to require correction before the mouth breathing habit can be overcome."

In conclusion, I beg to reiterate the following points:

1st.—The interdependence of the rhinologist and the orthodontist; the work of neither is complete without the aid of the other in very many cases.

2d.—I would refer particularly to early diagnosis and treatment of malocclusion of the teeth. This applies with equal force to the rhinological phase of the work when such is required. The references I have made to faulty development as an accompaniment of nasal obstruction and irregularities of the teeth point to the need of early treatment during the formative years in order that nature may not be handicapped in her effort toward full and normal development.

3d.—The treatment suggested not only benefits the health of the patient but in restoring the teeth to normal occlusion the comeliness of the face is greatly enhanced, as all must testify who have observed the results of proper treatment of these cases. In the case of the Division 1, Class 2, patients first referred to, who for instance could question for a moment that his future success in life largely depends upon correcting the deformity?

The professions of dentistry and medicine are just commencing to awaken to the results which are attainable along the lines we have considered. Such results are the reward of men who by thorough study and preparation, and natural adaptability to the work, find in it a life work that is not only a delight to themselves, but a blessing to the race.

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Discussion of Dr. Gray's Paper.

It is indeed a pleasure to listen to a paper which
Dr. Robert Levy. deals with topics that bring the dental and medical profession closer together. The subject under discussion is one which dentists and rhinologists may conjointly investigate and I have no doubt that many important problems that are now misunderstood, or at best poorly understood, will, by being thus jointly studied, be made more clear.

Among the causes of mouth breathing special attention should be called to deflected septum. This in itself may be an important cause as was pointed out years ago, but it may be a result of mouth breathing. As a consequence of this pernicious practice the vault becomes high and the space between the roof of the nose and its floor, which mark the superior and inferior attachments of the nasal septum, is shortened. As the septum grows it is bound to be bent to one side or the other if its upper and lower attachments are thus approximated.

I was particularly impressed with one point in the paper, which is of much practical value to those of us who practice rhinology. Not infrequently after a complete and thorough adenectomy, mouth breathing persists and upon closer investigation it is found that this is due not to nasal or naso-pharyngeal occlusion, but to deformity of the jaws inducing malocclusion. This condition, as was pointed out by the Doctor, is one which should be corrected by attention to the deformity, and therefore if mouth breathing persists after complete removal of the nasal and naso-pharyngeal obstruction, the patient should be referred to an orthodontist. It is well to bear in mind that mouth breathing, while frequently a habit, may also be due to deformity. An attempt to correct this habit without correcting the deformity would be obviously improper.

As to stammering we have been led to believe that this may be due to peculiar nervous and mental conditions, as well as to naso-pharyngeal obstruction interfering with the proper action and control of the palatal muscles. I am satisfied that many cases are essentially due to malocclusion and deformity of the teeth, a correction of which is essential in its treatment.

I was much pleased with Dr. Gray's paper.
Dr. F. L. Smith. Whatever I say I do not wish to be misunderstood as trying to tear down. All these theories we have are very beautiful, and I know of no better theory to follow than has been given us, but the things that perplex us every day as they come to us are the theories that do not pan out in a great many of the cases.

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I can cite lots of cases that would upset this theory in particular. Take the normal occlusion of the teeth, there is nothing more beautiful in the world but we are always running up against conditions that we can not quite bring under the theory. Where we have many cases that are typical of those the Doctor cited, we also have lots of cases, say of mouth breathers, where you have no such condition of the jaws; no recession of the lower or protrusion of the upper jaw. I am a mouth breather myself; never could sleep with the mouth closed; the upper teeth are receded rather than protruded; lower jaw the opposite. I have nothing approaching the normal occlusion of the teeth. I showed the condition to Dr. Ketcham the other day and he said "You certainly must have a hard time masticating your food." I want to say nobody can masticate his food any better nor with more pleasure than I can.

My mother has always been troubled with stammering. There could be no more perfect occlusion of the teeth than she has. Her face is normal, and there is no nasal obstruction. I think stammering is due to the fact that a person can not think and talk at the same time; can not get the language fast enough to express what is desired to be said.

In speaking of the removal of nasal obstruction and the subsequent development of the bones of the face I wonder if it is not very often the abnormality of the bones of the face and their positions, that causes this nasal obstruction rather than the nasal obstruction causing the abnormality. If you take these cases and remove the nasal obstruction, will the face develop as it should? Of course the nasal obstruction should be removed by all means, but do not be disappointed if this does not bring about the desired change in the face. How many differently shaped heads and faces do we see? Do you expect everybody is going to be formed exactly alike?

Another thing. A great deal has been said about the normal occlusion and the change it makes in the face and all that but no one has said anything about the shape of the jaws, the position of the teeth and alveolar process depending upon the shape of the bones of the face and their position. If you have the bones of the face and jaws depressed or protruded, would you not naturally expect to find the alveolar process and teeth conforming to them to a large extent? Does the alveolar process depend entirely upon the position of the teeth? Does not the shape and position of the jaw itself have something to do with it? We talk of expanding arches, and changing the shape of the face, but is there not a limit in many cases to the expansion of arches and what you can do with the face? Is there not a limit in many cases, to what can be done with a small receding lower jaw in the way of obtaining and maintaining normal occlusion, and in improving the face? These cases

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are usually cited as being typical mouth breathers. Are they always? Is the lack of development always due to mouth breathing and nasal obstruction? Is it possible to maintain a broad, rounded arch in cases where the face is thin and the jaws small and narrow? Even though the occlusion be made normal by extension of the arches, perhaps to the extent of tipping the molars and bicuspid buccally so that the buccal cusps do not meet, and the incisors and cuspids labially will not the influence of the inclined planes of the cusps and the muscles eventually draw the molars and bicuspid inward and the arches take the shape of the face and jaws to a large extent, thus protruding the incisors still more?

Some faces you would never improve, no matter what you did, because the trouble is in the immovable parts. But where the immovable parts are in harmony the face may be improved, or made worse by either depressing or protruding the mouth.

In riding down town mornings I have noticed a lady on the car; she is refined and I judge about thirty or thirty-five years of age; she has a small face, but the upper part of her face and her chin are in harmony. She has large teeth and as near as I can tell by looking at her her teeth are in normal occlusion but her mouth bulges out, reminding one more of an animal, because the foundation is not there for all those teeth and that sized arch. If the mouth could be set back in harmony with the rest of the face, you would have a very much better looking person.

Of course those are exceptions, the rule being normal occlusion, normal face, in the majority of cases but we are continually running into things that are a little outside the rule, the same as in other departments of the profession.

The thing that concerns me most is how to take care of these cases when they come in, not so much what was wrong with the ancestors, or whether the patient inherited this or that trouble. The question is, what can I do to correct it? On the whole, of course, we should stick to the theory that seems to cover most cases which the Doctor has given us.

The reason I speak of these things is because nearly all the articles that are written nowadays are so ideal that the beginner and the inexperienced are very apt to think that there are no exceptions to the rule.

I am well pleased with this paper and the discussion by Dr. Levy and Dr. Smith and I am impressed with the value of early diagnosis. It is better for the rhinologist to operate upon adenoids as early as four to six years of age, and for the orthodontist to move the lower arch for-

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ward, if in distal occlusion, back if in mesial occlusion, before the eruption of the first permanent molars. Then we will be more likely to have normal development of the nose, throat, the mouth, lips, teeth, the whole face and even the brain than if we wait until ten or twelve years of age before treating. One of the first things the orthodontist does in treating a mouth breather is to refer the patient to the rhinologist, and have all that is necessary done; then he places all the teeth in occlusion; but if the mouth breathing still persists, when the retainers are removed the upper incisors will move forward again, because they lack the normal pressure of the lip on their labial surfaces. It is also true that in some cases where the rhinologist has put the nose and throat in good condition, that the patient still breaths through the mouth, because the teeth are in malocclusion and the lips can not be closed normally. The rhinologist to do his whole duty should send all mouth breathers to the orthodontist for examination.

A case which interested me very much is that of Dr. Dunn who once practiced in Denver, then in 1902 studied at the Angle School of Orthodontia. At that time his teeth were in perfect occlusion, with long arches, in harmony with his long, narrow face. In San Francisco last winter he showed me that through some accident normal breathing was interfered with, mouth breathing at night being acquired. As a result one side of the lower arch has slipped back, and the upper forward, so that side of the lower is now in distal occlusion the width of a bicuspid tooth.

Dr. Smith has told you that his teeth are in malocclusion, and yet he can use them to good advantage in masticating food. I do not doubt this as I know Dr. Smith has much native mechanical ability, and no doubt he has learned to get the maximum amount of work out of a poor masticating apparatus. He has made the best of circumstances, just as a person with an artificial limb may learn to use it exceedingly well, while a clumsy fellow with sound limbs may go stumbling about. I do not know what the Doctor might not do if he had normal occlusion! In my own mouth the molars and bicuspid are in occlusion on one side only, while on the other they are in end to end "antagonism" similar to the results usually obtained in orthodontia in the old days, when we paid no attention to occlusion. I can take a nice tender steak, thick and rare, broiled over charcoal coals, and placing a piece on the side of my mouth where I have only "antagonism" of the teeth, work the mandible up and down, sideways, back and forward, and only get an ordinary result, while by placing a piece on the side where my teeth are in occlusion and bringing the interdigitating surfaces together normally a few times,

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the juices are expressed from the meat and the pleasure of the gastro-nomic act is increased one hundred fold; the value of food in digestion is also increased as much. Are there not millions of people in this world who can never know the pleasure and nutrition to be derived from food needing thorough mastication?

Let us work for the ideal of occlusion, though we may not always obtain it, and not stop because someone may do well with teeth in mal-occlusion, or with artificial substitutes.

In 1904 I read a paper before this Association
Dr. T. E. Carmody. | on the effects of mouth breathing, and some of the things spoken of then I think will bear repeating. The effect on the tissues of the mouth in mouth breathers is very important. The abstraction of water from the tissues does material injury, because taken from tissues not supplied by nature with more than is needed in their own economy.

One of the functions of normal breathing, is the warming of the air, as well as the moistening of it. The warming amounts to a very little, as proven by Kayser, as after tracheotomy the air is warmed to within one-half degree of that passing through the nose, but the moisture is very important, I think, because in these cases where we see the patients breathing through the mouth, the tonsils are irritated as well as the back wall of the pharynx and in the mouth the checking and breaking off of small pieces of the anterior teeth is very noticeable. In many cases cracks and fissures in the tongue may also be noticed.

As regards the air pressure, the reason for having deflected septum and high arch, may be partly that the negative pressure in the nose on account of there being but little air possible and the increased pressure in the mouth may have something to do with forcing the palate upward, drawing in the teeth and causing a deflection of the septum. The filtering out of dust particles can not be accomplished if the patient is a mouth breather and may produce wounds of the tonsils, and especially the back wall of the pharynx.

In regard to effect on general health after removal of adenoids and tonsils we almost always notice improvement, but we might think the improvement would be much greater if the malocclusion of the teeth was corrected, giving the child a normal occlusion thus enabling him to masticate his food properly. Here the orthodontist and rhinologist come closely together and should work together for the patient's good.

In regard to the stammering I might say a word. I do not think Dr. Gray meant to say that people with normal occlusion do not stammer. It may be due to some other causes. I had an interesting case of stammering come under my observation some time ago. The patient also

talked as if "tongue-tied." I found that the palato-glossus muscles on both sides were attached over on the tongue about one-half inch instead of having normal attachment. Whether this had anything to do with it or not I could not tell although after cutting the muscle on both sides the patient talked better. The patient was quite deaf, which may also have been partly the cause.*

Dr. Gray.

The discussion accorded my paper is most gratifying. I shall be satisfied if I can do my part in pointing out the necessity for the correction of malocclusion of the teeth associated with rhinological conditions. Doctor Levy, as indicated by his remarks, has a lively appreciation of the importance of such treatment.

It is not the extreme cases of malocclusion alone, however, that require treatment; there are other reasons for the correction of these deformities than that of securing normal breathing. If the occlusion of the teeth is not normal the patient suffers a disadvantage in the matter of properly masticating his food to say nothing of the mental unrest which the knowledge of the deformity causes.

Dr. Smith is perplexed because the "theories" with reference to malocclusion of the teeth associated with nasal obstruction do not always agree with the actual conditions as they are found. In studying the etiology of conditions so complex as those we are considering it is little wonder that perplexities should be encountered. I have aimed, however, to study the matter in a broad sense and in its most commonly noted results. In medical practice certain well known diseases are diagnosed and treated after certain methods, but the disease may not always yield to the treatment; certain sequellæ may complicate the condition, sometimes taxing all the resources of the physician to successfully cope with the trouble. However, the fact that this is true does not cause the greatest thinkers in the medical profession to formulate entirely new methods for treating these diseases.

Likewise, in orthodontia the knowledge of certain well defined principles is necessary in order to successfully treat the varying conditions that present.

I think it is no argument whatever against the beauty and usefulness of the normal occlusion of the teeth, to say that such and such a person, with an abnormal occlusion, can masticate and enjoy his food well. So do some persons who are the victims of certain chronic diseases enjoy

* It may be interesting to know that since the above was written, Dr. Carmody has seen the patient referred to, and reports that he does not stammer at all at present. This patient also suffered from malocclusion of the teeth, which has been corrected, and he is no longer afflicted with the "tongue-tie" accent.—G.

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a great measure of happiness but they are in fact so accustomed to their ailments that they can not possibly realize what joy perfect health would bring them. Nature aims at the normal; if she did not, what a poor race of people we might soon become!

As to whether or not normal development of the bones of the face subsequent to removal of nasal obstruction is to be expected I should say yes, everything else considered. That is, if there be no untoward influence at work, the normal development would ensue, and while it is true that the faces and heads do vary greatly Nature usually manages to produce a type that is pleasing if she is not interfered with. Naturally enough the age at which these corrections are attempted would have much influence on the results to be obtained—the early formative period being best of course.

A case was mentioned in which although the normal occlusion of the teeth seemed to be present, there was still much apparent deformity of the face. If the Doctor could examine this case critically he would probably be able to determine wherein the inharmony originated, and if mature age were not a hindering factor a wonderful improvement would likely be possible. Of course an occasional case may be a real monstrosity which I have not meant to consider.

Referring to a further point suggested by Dr. Smith, with reference to the position of the teeth and alveolar process depending upon the shape of the bones of the face and their position. When we are considering the size, position and shape of the bones of the face, it is well to remember that these vary greatly but that with all their variation it is the rule that Nature conserves her interests in this as in other things, and sees to it that these parts are in the best possible harmony with the type of individual. The more closely we study along these lines the more do we realize the necessity for wise discernment in treating malocclusion of the teeth. The man who undertakes the correction of these conditions on a purely mechanical basis, with no idea of art relations, will surely fail.

The alveolar process is certainly provided for the support of the teeth and as to the shape and position of the jaw having anything to do with it it certainly has; all these parts are interdependent and their harmonious placement is what Nature aims to bring about.

The Doctor also asks, "Is it possible to maintain a broad, rounded arch in cases where the face is thin and the jaws small and narrow?" I would reply that it is perfectly possible to do so if the requirements of the case so demand. There is no reason why such an arch should be demanded where the jaws are "small and narrow" except in cases of retarded development, and in such cases if proper treatment be had at the

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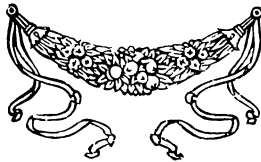
right age, the most gratifying results may be expected. There is a certain harmony or fitness of things that must constantly be borne in mind in treating malocclusion of the teeth.

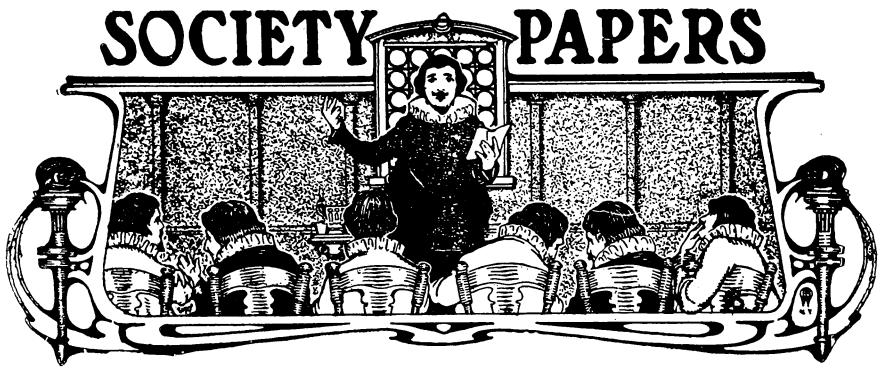
The points brought out by Dr. Smith are such as are calculated to stimulate interest and study and have an influence for good in any consideration of the matter which has been discussed.

I am glad Dr. Ketcham makes the point with reference to early diagnosis that he does, for I believe our most successful treatment may then be given. Certain it is that the orthodontist's work is less complicated when done at a comparatively early age, and the results obtained may then be of the highest order. The case he cites wherein distal occlusion was brought about in mature life as a result of some nasal obstruction is of particular interest. My impression is that this must be of rare occurrence, under such circumstances.

Dr. Carmody's remarks were most interesting. I noted particularly what he said with reference to the deflected septum, its relation to mouth breathing, the high arch, etc. That the negative air pressure in the nasal passages and an increased air pressure in the mouth could cause a deflection of the nasal septum might seem incredible but let us remember that it is the constancy of the perversion that may do the damage. We know what the influence of abnormal pressure of the lips or cheeks may be on the occlusion of the teeth. No bad effects would come in a very limited time, but, long continued, the normal arrangement of the teeth would suffer. Likewise in the case of the deflected septum it was probably not brought about in a few weeks or months but followed as a result of long persistence of the abnormal conditions referred to.

With reference to stammering my comments were simply incidental. Whether stammering, truly as such, is influenced by malocclusion, my experience does not enable me to say further than that certain impairments of speech are caused by irregularly arranged teeth.





Pyorrhea: Its Relation to Malocclusion and Its Treatment.

By A. H. KETCHAM, D.D.S., Denver, Colo.

Read before the Colorado State Dental Association, Denver, June, 1906.

With a keen realization of my limitations from a scientific standpoint I will give a few observations on the great scourge of the peridental membrane commonly called pyorrhea alveolaris, but first I wish to make a personal explanation.

When I decided to limit my time to orthodontia and pyorrhea I expected to be able to study both subjects and master them as far as possible, but I have found that to be really proficient in either requires that all the time and strength encompassed in the lifetime of one person should be devoted to but one subject. As my life work is to be orthodontia I have neglected the scientific aspect of pyorrhea.

I believe that the next great specialty in dentistry will be oral prophylaxis which, besides keeping the teeth as clean as possible, thus limiting the ravages of decay and maintaining their supporting structures in a healthy condition, will include the treatment of the diseased conditions of the peridental membrane, alveolar process, and the gums, due to filth, to the accumulations of salivary and serumal calculi, and attention to those conditions of faulty metabolism resulting in lack of tone of the tissues involved.

From its earliest history dentistry has been concerned with the restoration of lost tooth structure, little attention being paid to prevention of this loss. How much better it is if not erupting normally to place the teeth in occlusion so that the best use may be made of them in preparing the food for digestion; so that they may support each other, so that the contour of the face may be at its best, and so that they may

be readily kept clean, and then keep them clean, thus limiting decay and diseases of the supporting tissues of the teeth. There is a grand, a great field waiting in each city of our fair land for the right man who will take up oral prophylaxis. A field full of fair promises of renown and a lucrative practice, but he must be the right man, in love with his work for its own sake, with courage to stick to it and win in spite of temporary defeats, and with such a passion for knowledge, that all his spare time will be spent in study and research. To achieve the greatest measure of success, besides a good training in dentistry and in medicine as well, and the mastery of the technic of removing deposits from inaccessible pockets on the roots of the teeth, and the making of delicate retainers, he should have a good knowledge of bacteriology and chemistry and a thorough knowledge of the nutrition of the body and of the elimination of its waste products. Then above all he must be a broad-minded, level-headed gentleman. Can we prophecy anything but success for such a man, when the graduates of the Angle School of Orthodontia are proving that the right man may be successful in a dental specialty in a prosperous town, even if it only has 25,000 inhabitants? The success of these men is paving the way for other dental specialties in comparatively small cities so that those who follow while leading a strenuous life, will not have the hard fight which has been the lot of the pioneers.

Pyorrhea Classified.

To return to the subject of this paper, pyorrhea alveolaris is usually divided into three classes.

First: Those arising from primary gingivitis with the presence of hard, scaly, dark calculi beneath the gum margin.

Second: Cases which Black describes as phagedenic pericementitis, in which gingivitis may not be marked, and early deposits may be entirely absent; but there is necrosis of the pericementum advancing in more or less of an irregular way.

Third: Cases in which degeneration and necrosis of the pericementum and deposits of calculi occur upon some lateral aspect of a tooth, the gum margin being apparently normal. In all these classes where there has been considerable destruction of the peridental membrane and alveolar process, the teeth become more or less loose and move out of their normal positions into malocclusion, or if already in malocclusion, it is intensified.

Treatment of Pyorrhea.

The treatment may be briefly summarized as follows: First—Removal of all the calcarious deposits from the roots of the teeth and cauterization of the pockets; second—fixation of loose teeth; third—cleanliness and systemic treatment when indicated. Of course,

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in the second class there are no deposits and I believe Harlan recommends proceeding with the treatment just as though the deposits had been removed.

When upon appointment for examination a pyorrhea patient is first presented it is my custom to examine the teeth carefully to determine approximately the extent of the disease, the looseness of the teeth, and the care that the person has been in the habit of bestowing upon them. If the teeth show that they have received almost no care and the person appears to be careless about personal cleanliness, I refuse to take the case as I believe it is better to let such a person go and work out his or her own damnation rather than to try to treat the case and have it relapse after a short time from lack of care. If a decision is reached to treat the case, an appointment is given for one hour. In a case of the first class, after spraying the mouth the usual treatment, which is varied according to circumstances, is to place one of Mulford's cocain and adrenalin tablets upon a glass slab and add a drop of water; then this syrupy solution is carried into the pocket around the tooth to be treated with a delicate spatula blade bent at an angle; then the proper instruments are selected. Personally I prefer Harlan's, Darby-Perry, White's, and some of my own fashioning, preference in order named. If necessary one hour or more is spent upon one tooth though usually more than one may be scaled, but whatever surface is started should be finished at that sitting and must be cleaned thoroughly, a careful examination of the sides of the pocket being made as sometimes there is an extension of the pocket running to one side part way up the root. These sittings are repeated until all the affected teeth are scaled. Usually if the scaling has been done thoroughly pus does not form again in that pocket, but if it does in a few days and the tooth upon testing proves to have a vital pulp the chances are that a scale is still present upon the root. Of course, if a pocket extends near the apex of a root the tooth should be tested for vital pulp, and if pulp is found dead, the foul canal should be treated and filled in the usual manner. Sometimes even then pus will continue to form and the apex of the root may be found to be absorbing; then the amputation of the root in a multirooted tooth or of the apex in a single rooted, if the tooth is held by attachment of pericementum to one side of the root, will usually effect a cure. Sometimes a skiagraph will show that the root canal is nearly filled with a deposit of secondary dentine, the pulp dying before the deposit filled the canal, and an alveolar abscess resulting. I have found this condition in lower incisors and cuspids and attributed the secondary deposit of dentine to the irritation to the tooth pulp from thermal changes, etc., upon the exposed root.

**Treatment by
Patient.**

At each sitting I endeavor to impress upon the mind of the patient the necessity for cleanliness, explaining that after I have done my work thoroughly, then the success of the treatment depends in a great measure upon the care they give those teeth and gums. I insist that at least after each meal a quill tooth pick or dental floss must be used, being careful not to lacerate the gums. This is followed by a spray of H_2O_2 in a nasal atomizer with a right angle point, so as to force the spray between all the teeth, and drive the particles of food from between the roots and out of the pockets. The ordinary spray is too weak, and it would be much better if the patient could have compressed air, registering from thirty to fifty pounds in an inexpensive form of tank. Spraying is followed by vigorous use of a tooth brush with hard bristles shaped like a Prophylactic, or one with alternate rows of bristles missing. Several brushes should be provided so that one need not be used more than once during the twenty-four hours, and put away to dry the balance of the time. The lower teeth should be brushed up and the upper teeth down, as much as possible. A dentrifice having an alkaline reaction, like Calox, is preferable, and magnesia should be used to neutralize the acid reaction of the H_2O_2 . After brushing, the gums should be massaged for fifteen minutes with firm but not too hard pressure from the fingers, rubbing in the same direction as brushing. You may think that this is more time than a patient will spend upon the teeth each day, but in a bad case if the teeth are to be saved, this course of treatment must be followed for a few months at least.

After the scaling is completed I see the patient once a week and spray out the mouth with an alkaline antiseptic and touch up any spot on the gums needing stimulating with tinct. iodine, iodide of zinc, and glycerine, or aromatic sulphuric acid, sometimes finishing with sulphate of quinine in a powder atomizer under heavy air pressure, filling the pockets full. If the roots of the teeth are sensitive, they may be painted with nitrate of silver, protargol, or argerol; if the former is used protect the gums with cotton and follow with salt solution. The time between these treatments may gradually be lengthened until once in one, two or more months will be sufficient, just to polish surfaces of the teeth not covered by the gums and to see that the patient is not neglecting them. No matter if the teeth are treated properly by the operator, if the patient allows fermenting food to collect around between the roots and beneath the gum margins, reinfecting the pockets, a cure can not be affected. But with conscientious effort and the co-operation of the patient, many a cure may be accomplished. I believe that as high an average of cures may be secured by oral prophylaxis as by the rhinologist, and I trust

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that we may discover some method of stimulating the tissues involved in pyorrhea so that so much will not depend upon the patient's care.

A year ago I purchased a complete X-ray outfit, intending to try its stimulating effect upon these tissues, as Dr. Weston Price, of Cleveland, and Dr. Rhein, of New York, reported favorable experiences with it, but I could not take the time to experiment without neglecting orthodontia. When one of the two or three gentlemen who are thinking of limiting their time to this work here in Denver actually start it will give me great pleasure to refer my pyorrhea patients to him.

Prevention Recommended.

When the specialist appears upon the scene, his patients will visit him every few weeks and have all the surfaces of the teeth above the gums cleaned, he will pay special attention to the gum margin and if it is not perfectly healthy, will locate the cause and if serumal deposits are present, remove them, thus preventing the first class of pyorrhea. He will study and experiment, keeping a careful record of all his cases. It is too much to hope that he will discover the causes of the deposits upon the roots of the teeth in the first and third classes and the necrosis of the pericementum in the second class. There are those among us who dispute the systemic origin of the second and third classes, but I should not be surprised if it is eventually found that faulty assimilation of the food and faulty elimination of the waste products has a great deal to do with all the cases and classes. But we are only guessing; what we need is careful scientific research, and science is but classified knowledge.

Pyorrhea in Relation to Malocclusion.

Pyorrhea alveolaris is one of the pathological causes of malocclusion, the malocclusion progressing rapidly as the support of the teeth is destroyed. In many of these cases correcting the malocclusion will improve the health of the peridental membrane and alveolar process, but thorough treatment of the pyorrhea must be given first, and in only the most favorable cases would I advise extensive movement of the teeth. The retention is really the most serious problem involved in treating malocclusion in pyorrhea, permanent retainers for some of the teeth being often required.

Fig. 1 shows a pyorrhea case which I treated in 1900 with the most gratifying results, the flow of pus ceasing upon the removal of the deposits and the gums soon assuming a normal color and hugging the teeth tightly. This patient was faithful about the care of her teeth and followed my instructions to the letter. In 1902 there having been no recurrence of the pyorrhea I began the treatment of the malocclusion with the result shown. After two years the retainers were removed, when

the right upper lateral incisor started to move labially again and the left to rotate slightly. These were placed in position the second time and retained by drilling a hole in the lingual fissure of each, then placing a snugly fitting 22-gauge iridio-platinum post with a pure gold cap or collar around outer end thus protecting the cavity. A plaster impression was taken with posts in position, then model constructed and round

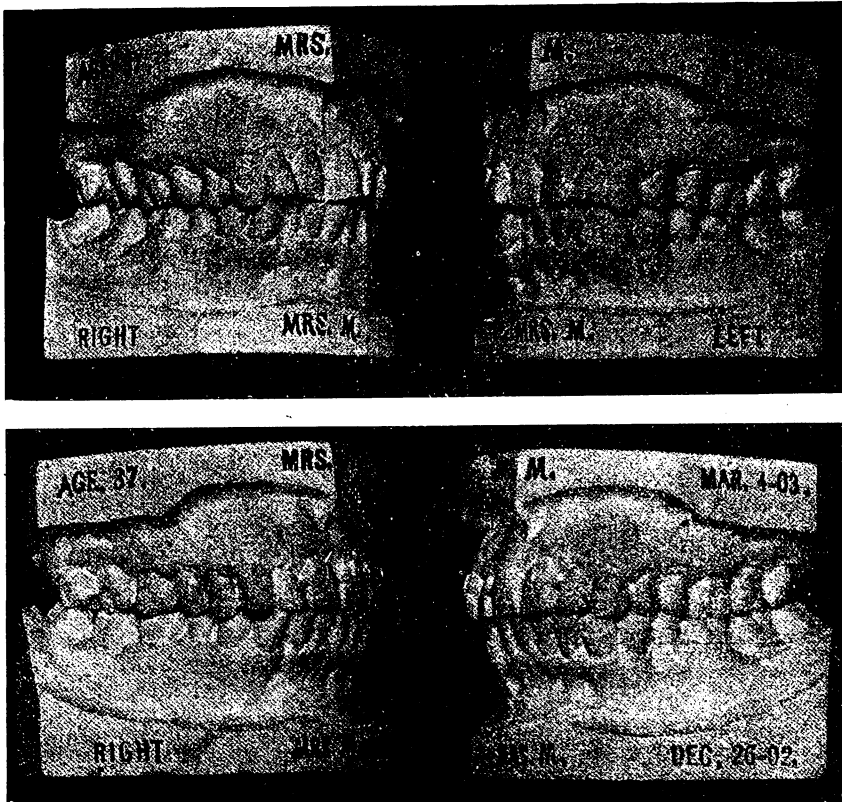


Fig. 1

iridio-platinum wire soldered between, uniting the posts which were then cemented into place as described by Dr. Case in proceedings of the Fourth International Dental Congress. This appliance is retaining these teeth and will have to be worn permanently, but as it can not be seen from the labial side and is easily kept clean, it is not especially objectionable.

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The lower incisors also started to move, so connected bands were cemented to the cuspids and are holding the teeth perfectly and will also have to be worn permanently. In 1905, after this patient had spent the summer on the coast I found three places where the gums were inflamed on lateral aspect of as many roots, and going over her teeth carefully in three or four sittings, found altogether five or six scales, most of them minute but one just under the gum margin on the distal surface

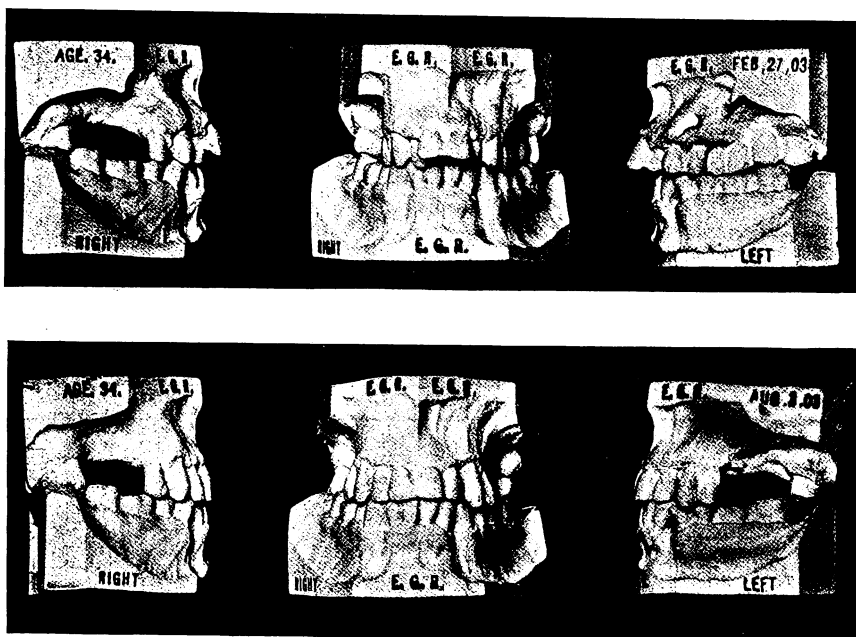


Fig. 2

of a lower third molar was quite large. At this time I noticed a sweetish acid odor to the breath, so often described by one of my old teachers, Dr. Geo. F. Eames, of Boston, the author of *Dental Medicine*. After the deposits were removed the gums resumed their normal tone in a few days.

Fig. No. 2 is of a case in which the upper central incisors were quite prominent, so much so that the upper lip did not cover them. The deposits were removed from the roots of all the teeth and in a few weeks the regulating appliances adjusted and the eight anterior teeth moved back the width of a bicuspid. These were retained by a wire resting on labial surfaces of the incisors and vulcanized into a plate which carried

the missing bicuspid and molars; then after nine months the missing teeth were supplied by bridges and these with the upper lip are the only retainers employed. The pyorrhea has not recurred.

Sometimes where a tooth is lost and the pyorrhea teeth have moved partly closing the space, as in Fig. 3, it is best to regain space for a substitute of the normal width, Fig. 4.

In Fig. 5, I thought it best to true up the incisors and make normal



Fig. 3



Fig. 4

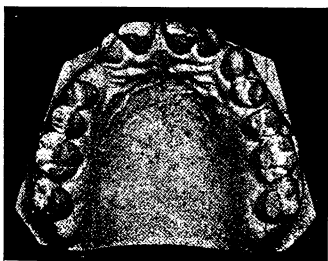


Fig. 5

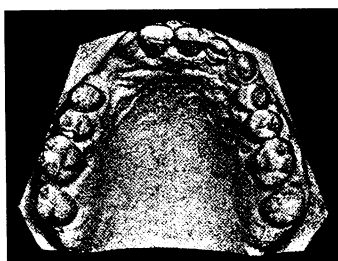


Fig. 6

space for missing tooth, then retain the incisors and cuspid by post cemented in lingual pits and connected by retaining wire. Fig. 6.

Sometimes we find the upper central incisors widely separated, Fig. 7; these can be drawn together easily, after treating the pyorrhea, and permanently retained by the retainer mentioned above—Fig. 8.

Retainer for Pyorrhea Teeth.

In the worst cases we find many of the teeth quite loose. In case of the lower incisors, a retainer, Fig. 9, suggested by Dr. Harlan, is very good. After scaling place the rubber dam over the teeth to be retained, including one more at each end, then if the cuspids are fairly firm, begin with one and weave a fine gold or gold and silver wire around the incisors and tie to the other cuspid trying to draw the irregular teeth into line; then cover this wire with a solution of celluloid

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dissolved in acetone the consistency of cream, working this around and between the teeth over the wire into the shape of bands. After a couple of hours the patient may be dismissed with a coating of sandrach to protect the celluloid and the next day with a sharp knife, stones and disks, the celluloid may be trimmed and polished. This makes a good temporary retainer, one which does not separate the teeth nor cause as much pain



Fig. 7



Fig. 8

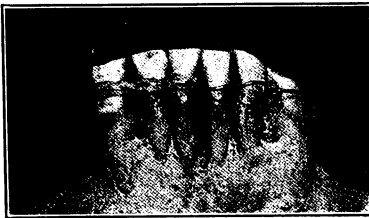


Fig. 9



Fig. 10

as fitting metal bands and it can be used on very loose teeth. After six months or a year when the teeth are more firmly fixed in their places a permanent retainer may be placed. If the cuspids are also loose, cement Angle clamp bands upon the bicuspid and attach wire to these. For the celluloid cement use celluloid in thin sheets obtained at any art store; add acetone same as you would mix shellac varnish.

A good retainer for a single loose tooth similar to one used by Dr. Angle, is to make a band for the tooth from thin band material then solder four spurs to its gingival edge, one at each of its four angles, the mesio-labial, mesio-lingual, disto-labial, and disto-lingual, Fig. 10, these spurs to touch the tooth standing mesially, at its neck labially and lingually and to touch its distal neighbor in the same places. After the band

is cemented to the loose tooth, these spurs may be pinched tightly against the necks of the adjoining teeth and thus retain the loose tooth with the minimum amount of attachment to its neighbors. Care must be exercised to have the spurs touch the anchor teeth at their necks for if against the labial and lingual inclined planes of a cuspid or incisor, the loose tooth might slide out of its socket. On account of their shape, loose bicuspid and molars are hard to retain. Sometimes I use combinations of plain and clamp bands soldered together and cemented in place close to the occlusal surfaces, but bands materially increase the difficulty of keeping these teeth clean. I have one patient in whose mouth on one side the first bicuspid and second molar are quite loose, while the second bicuspid and first molar are comparatively firm. Her son, who is a dentist, will devitalize the pulps in the loose teeth and cut a deep groove distally from the pulp cavity in the first bicuspid through the second bicuspid and first molar to cavity in second molar; then he will take an iridio-platinum bar of the proper length and gauge, bending the ends at right angles, and fit them into the pulp cavities in second bicuspid and second molar; after the ends are cemented into place, amalgam may be used to fill the cavities and grooves over the bar. This will not be as conspicuous as the bands on the bicuspid and will be easier to keep clean.

In conclusion I can only say that in treating these cases, eternal vigilance is the price of success.

Discussion of Dr. Ketcham's Paper.

Dr. Smith. I was much pleased with Dr. Ketcham's paper, and wish to express my appreciation of his thoughts along these lines. I think his theory right; all depends upon how well it is carried out. Only I am not quite as sanguine as the Doctor is as to the future hopes of success in these cases. I think we should do all that can be done, but we should not expect too much. We get a feeling from so many of these papers that all these things can be carried out just right. I have not as much faith in the systemic treatment and scientific research, etc., as I have in the good thorough mechanical work in cleaning these teeth, and maintaining them properly. I believe there is more in thorough cleaning and retention than in any medical attention you can give them. If this is done thoroughly, you have done the most that can be done. Of course, in a good many cases, the medical treatment plays a part, but not so much as the other.

I have made up my mind to this, that when you talk about cures

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for these bad cases, you are going a little further than the law allows, considering the conditions you are handling. Where the peridental membrane is gone, the pericementum, the process, you need never expect to bring any of that back; where the gum is held up by the healthy attachment around the rest of the teeth and the adjoining tooth so that you have a permanent pocket by having the gum loose, you are going to have trouble as long as that condition remains. You may go over the teeth and cleanse them as often as they need it, and keep them free from pus and anything that might get in there, but you still get that condition; you can not say you can cure it. If the pocket is on the lingual surface, for instance, although it may be very deep, if you can cause a recession of the gum as far as the attachment, you can often get rid of your trouble. I have had cases in which by determining how far this condition had gone, and then cutting out a large piece of tissue between the attachment and the free margin of the gum, I have drawn the gum down and gotten rid of the pocket. Very often you will see nature has taken care of it in that way on the lingual roots of upper molars and the anterior teeth, where there seems to have been an attachment and the process seems to have gone all the way round the teeth so that the recession was even.

Dr. Case's appliances for holding the teeth after regulating (for pyorrhea cases) are made to fit the teeth perfectly when cemented on, and hold one tooth as rigidly as the other, no matter how loose they may be.

I feel about these pyorrhea cases a good deal as I do about tuberculosis; with the lungs and tissues gone, you can not bring them back; so long as there are pyorrhea pockets you can not get rid of suppuration; when you can arrest the condition and get the places to heal, and have proper care on the part of the patient, they will often do well. However, the weakened condition will probably always be present.

The necessity of retaining and holding the teeth firmly in place so they can not move around, is apparent. The meanest condition we have is where the pocket is between the teeth. About two-thirds of the length of the root may be involved in a case of this kind. These conditions are very discouraging sometimes, though sometimes we are very happily surprised to see what nature does in some cases.

Two ladies who were in my office some time ago had recession of the gums on some of their teeth to the extent of $\frac{1}{8}$ to $\frac{1}{4}$ -inch; the gums were healthy, there being no pockets at all. One of the ladies had never heard of pyorrhea until someone had advised her to go to a certain man in the city. He scared her by telling her she had a very bad case of pyorrhea, which she should have treated right away; that there was pus around all of the teeth, etc. She did not see it, however.

Dr. Chambers. Dr. Smith and Dr. Ketcham have both emphasized the fact that the first thing necessary is thorough removal of all desposits. We have heard that ever since Dr. Riggs took up the subject. I think the music on pyorrhea about the same as it was forty years ago; the only difference is we have these different methods of anchoring and fastening teeth; these will help us out wonderfully.

Dr. B. Frank Gray. Any degree of success in the treatment of pyorrhea, requires a quality of knowledge, patience and adaptability, that the average dental practitioner is quite willing should be exercised by the man who makes a specialty of this work.

The demand for the services of the orthodontist was made possible because of the comparatively inadequate attention paid to this branch of the profession by the general practitioner. The same is true of pyorrhea. As soon as the specialist in this work proves his ability to successfully treat the disease, he will receive that recognition which he deserves.

Launching out into special practice of this character is somewhat in the nature of an innovation, and the results attendant thereon will be in proportion (everything else considered) to the amount of actual study and energy put into the work.

Dr. Ketcham. We all agree upon the necessity for thorough cleansing. It is the old, old story, but some day when we have a man who will devote his time to this subject, a scientific man, a man who will acquire knowledge and classify it, and keep getting higher and higher and not dissipate his time and strength on gold fillings, orthodontia and everything else, then we will probably accomplish more in a few years than we have in forty. What we need to know is what causes these deposits; and how to prevent them. If the right man gets hold of the subject, a man like Miller, Angel, Kirk, or Black, who will devote all his time and energy to this, we will probably see the after treatment of pyorrhea revolutionized. Now the best after treatment I know of, is thorough cleaning and stimulation of the pockets where irritation may come about from infection, and in some cases an anti-rheumatic systemic treatment, but we must depend principally upon the patient's care.

As to cure or no cure, in the majority of cases if we first do our work conscientiously, and give the patients to understand the part they are to play in the treatment, spraying, scrubbing, and massaging, and they do it thoroughly, and their metabolism is not too faulty, we will probably get a cure; I do not mean restoration of lost process or other tissues, but a filling of the pockets with scar tissue and a constriction of the gum

so that it closes around the tooth tightly; if we can get this, it is better than the practice of cutting away the fleshy walls of the pocket in order to destroy it, and leaving a large portion of the tooth root exposed.

Prevention of Disease in or Through the Oral Cavity.

By DR. A. L. WHITNEY, Denver, Colo.

Read before the Colorado State Dental Association, Denver, Colo., June, 1906.

As oral surgeons and oral physicians, it is our duty to familiarize ourselves with the diagnostic symptoms of the oral tissues, that we may do all possible to ward off disease or cure existing diseased conditions. Infectious or contagious diseases are now recognized to have their origin in minute vegetable organisms known as bacteria. It may be well to consider for a moment the relation of the oral tissues to bacteria. The mouth under the most favorable circumstances is an ideal incubator for the development of many forms of bacteria, and bacteria both pathogenic and non-pathogenic are present in the mouth at all times. The life-circle of these bacteria demand certain conditions, viz.: suitable temperature, moisture, food, and a removal of their waste products sufficient to prevent their own destruction. That all these conditions are found within the oral cavity goes without saying.

Bacteria in the Mouth.

The oral cavity is the main gateway to the entire body, and it is through this gateway that many destructive diseases find their origin from infectious material in the mouth. Dental bacteriology is still in its infancy; however, much good work has been done by such men as Miller, Black, Goadby, Leber, and others. Through their efforts we are told that local lesions are found in the mouth indicative of constitutional and acute infectious diseases. The micro-organisms of tuberculosis, thrush, erysipelas, anthrax, actinomycosis, and others, are often present in the mouth, and, with purulent discharges from abscesses, and pyorrhea pockets passing into the stomach, may produce general catarrh of the digestive tract.

Nature puts up natural defences against these invading micro-organisms. She endeavors to prevent their entrance into the tissues. The skin is a natural mechanical barrier, and when unbroken is almost impregnable to bacteria. Many bacteria, that gain entrance through the mouth by food, air, or drink, become mixed with the mucous secretions and are carried away. Healthy mucous has a devitalizing power for certain organisms.

The gastric juices kill many and the intestinal juices retard their development, so that comparatively few develop to the extent of producing infection, and further, when bacteria do gain access to the tissues, they still have several elements with which to contend. There is a germicidal substance in the blood, which is a product of the leukocytes and resembles neuclein, called alexin, which prevents their development. So between the process of phagocytosis, positive chemotaxis, the alexin of the serum of the blood, the gastric and intestinal juices, Nature puts up a good defence herself. If, however, in the struggle for existence, these natural defences fail to perform their entire duty, whether from fatigue, disease, or debility, the tissues fall a prey to the invaders and disease results. The bacteria are for the time masters of the situation. The occasional failure of these natural policemen of the body to protect makes it necessary for us to assist by artificial defences. The *keystone* of *prevention* lies in *hygiene* and *prophylaxis*. Fermentation, putrefaction, and uncleanness in the oral cavity predominate in and about the teeth; consequently these organs need first attention. Prevention is better than cure.

Oral Prophylaxis.

Few teeth receive sufficient exercise. The more highly civilized a community the greater the ravages of decay, and degeneration of the pericementum. This is due largely to a lack of exercise owing to the abundance of prechewed and predigested foods consumed. Nature's method of prevention is, to keep the teeth and the surrounding tissues healthy by proper exercise.

Teeth, the hardest tissue in the body, were intended for service. Proper exercise cleans the teeth and strengthens the surrounding tissues.

The trend of modern science is toward the prevention of disease.

If the environment of the mouth can be controlled the teeth are rendered immune from decay.

Realizing the desirability of preventing disease in the mouth, many patients are pleased to avail themselves of frequent oral prophylaxis at the hands of the dentist.

There is no doubt that this is a step in the right direction. When we take into consideration the complex association of tissues that exist in the oral cavity, and their intimate relation to other tissues both by contiguity and continuity of structure, it is easy to realize that any disordered condition in the mouth must necessarily affect, in a greater or less degree, organs or structures that are thus intimately associated, and, vice versa, disordered conditions in other organs or tissues more or less remote may be manifest by derangements in the oral cavity. Many local irritations, inflammations, and hypertrophies are allowed to pass the dentist without proper treatment. These dentists are designated by the late Dr.

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W. C. Barrett as unfaithful practitioners. They belong to the class who bewail the influx of new dentists, insisting that the profession is already overcrowded, while they themselves are neglecting a large field that should properly be covered by the oral physician.

Diseases Having Oral Manifestations. Among the lesions found in the mouth indicative of systemic disturbances, and which we should recognize specially, are those of syphilis, on account of its malignant character, especially in the first and second stages, and the danger of infection both to the operator and succeeding patients. These lesions should be easily recognized in most cases if we remember a few of their general characteristics. The primary stage is shown by the chancre. It is a single sore, appearing at first as a pimple, which soon breaks down, forming an ulcer, the discharge of which is very infectious. The principal diagnostic symptoms are the absence of pain, soreness, or discomfort to the patient. The base is hard like cartilage and the nearby lymphatic glands soon become enlarged. The secondary stage is shown by reddish eruptions, enlarged lymphatic glands, and mucous patches or plaques in the mouth which have a crater-like appearance, raised at the edges and eaten out in the center and discharging a sanious very infectious fluid. The tertiary stage is shown by the gumma or lump beneath the surface, which may break down leaving an ulcer. Hereditary syphilis is shown by the so-called Hutchinson teeth when other indications are present. Arrested development of the teeth is seen, resulting from eruptive diseases of the skin or fevers occurring during the period of development. Spongy gums and loose teeth are seen in cases of scorbutus and diabetes.

Neuralgia, rapid caries and gingivitis are common during pregnancy; pigmentation of oral tissues in Addison's disease; the blue line on the gums in plumbism; pericementitis and gingivitis in cases of uric acid diathesis, etc., etc.

Gastric disturbances are often reflected to the tongue. The normal healthy tongue is of whitish-pink color, smooth and moist. In hyperacidity it is of a dull-whitish color. In an alkaline state with arterial congestion it is red with fur. The danger symptoms of the tongue are tremulousness, dryness, a very red or very dark hue. The tongue is an index of the progress of disease. As the disease progresses it becomes furred toward the point; as the disease diminishes it clears up from the point backward. The symptoms of the tongue are not so reliable in old age.

Prophylactic Treatment. The late Dr. Bonwill many years ago (1887) claimed that he could cure pyorrhea alveolaris by keeping the teeth clean. And to-day after years of experimental research we can safely say that, although

there may be predisposing systemic causes, local infection of the pericementum is essential to the disease, and further, if the infectious accumulations are removed, there is shown a marked improvement in the tissues. There is only one way by which these accumulations can be removed, and that is, by instrumentation. Under frequent cleansing and massage the teeth and gums and pericementum become improved and so remain; even the enamel seems to respond and become more translucent. The technique of treatment for the thorough removal of deposits and restoring the tissues to health is familiar to all. Scalers, pumice, or some abrasive carried on rubber or wood points of various shapes are used. Twine and floss silk are used. Antiseptics are freely and forcibly used at all stages of the process, and after all a germicide and astringent, as there is danger of inoculating the tissues, and a tonic astringent action is desired. Trichloracetic acid 25 to 50 per cent., lactic acid full strength, sulphuric acid 25 to 50 per cent., are among those most beneficial. Long cusps, pits, and groves may be polished. A smooth, self-cleansing surface is not liable to decay. Enamel is not to protect the teeth from decay so much as it is to strengthen them and prevent wear.

In cleaning out deep pockets, the push or pull movement is used with differently shaped scalers and abrasives, until the surface of the root is perfectly cleansed. Inaccessible pockets may be enlarged by packing with a ten per cent. solution of trichloracetic acid, on cotton, for ten or twenty minutes. It is not my intention to detail the prophylactic treatment of pyorrhea alveolaris; you all know how difficult and tedious the process is to both the operator and patient.

The object of this paper is to emphasize and recommend oral prophylaxis, and present for your consideration at the clinic an attachment for the dental engine by means of which a forward and back movement is obtained, similar to that used with scalers, chisel, files, abrasives, etc., only under better control and a hundred times more rapid and effective.





Chemistry: Its Relation to Dentistry.

A Plea for a Broader and More Scientific Research.

By DR. WILLIAM A. LOVETT, Brewton, Ala.
Read before the Alabama Dental Association.

In attempting to discuss so broad and scientific a subject as that of chemistry, I appreciate keenly the difficulties of the task assigned me. Its very broadness renders it exceedingly tedious to condense in a short paper that which may be of most interest to men who are thoroughly familiar with the subject.

It shall be my purpose to make a special plea for a deeper and more scientific research by the dental profession generally, to the end that we may be better able to give practical application of chemic laws to dental practice.

In 1889, Dr. Mitchell predicted that within ten years from that time the course in chemistry for the dental student would be distinct from that of the medical student, except possibly in a few minor particulars, and that he knew of no professional man to whom chemistry would eventually prove more valuable than the dentist. "Many of the most perplexing problems," said he, "with which the dentist has now to deal, will in due time be solved by the dental chemist."

This must be true, for to whom else may we look for a solution of these problems but to a chemist who is also a dentist, and who knows what these problems are, and who is sufficiently interested and competent to carry on a scientific research of this kind? No abbreviation of the study of the fundamental chemic laws would result from this special course. It would be necessary to cover the same ground we do now, extending our studies and experiments into special lines more particularly suited to the requirements of the dental practitioner.

An elementary knowledge, at least, of the subjects of gravitation, heat, light, sound, electricity, magnetism, pneumatics, and hydrostatics can not be too strongly recommended for the student of chemistry. Information acquired of these topics will prove invaluable to the dentist in his daily practice. Since the educational requirements of prospective dental students is so limited that they are not expected to have much, if any, knowledge of physics before entering our dental colleges, I have long thought that these institutions would, by adding this branch to their curricula, take a very advanced step toward a better and more extended system of dental education. Some schools have done this, but I am not sure that it is sufficiently emphasized.

**Inadequate
Preliminary
Education.**

It is to be deplored that, though the educational requirements for entrance to most of our dental schools is very insignificant, some of them do not even inquire of the matriculant as to his capability of meeting these requisites. They thus shirk the responsibility imposed on them by the National Association of Dental Faculties, with the result that we have men entering the profession who can not read and write the English language with any degree of correctness. Our medical brethren can complain too of this sad condition of affairs. It should by all means be corrected, and the standard for entrance raised even higher than it is to-day, or else the burden of keeping up the high ideals of our profession will eventually fall upon the shoulders of a few men who love their calling and are loyal to its every interest.

It has been said that American dentists are the best dentists in the world, and when located in foreign countries are sought after in preference to all others. It is also said that our best cements are imported from Germany. Whether this last statement is true or not, I do not know, but I think you will agree with me that the German scientists, by their thorough knowledge and constant experimentation, have given us many things which, perhaps, would never have been discovered had it not been for their devotion to science and untiring energies exerted in promoting its interests. I am proud of the fact, if it be a fact, that the American dentist leads in operative and mechanical skill, but if we take these acquirements as our sole claim for ranking dentistry as a branch of one of the learned professions, we at once unprofessionalize ourselves, in that ours would no longer be "an occupation that properly involves a liberal education, or its equivalent, and mental rather than manual labor." We might just as well place engineers and mechanics generally among the learned professions as to rank dentistry with them if we fail to appreciate the necessity of having a high educational standard as a requirement for entrance in our dental schools, or eliminate any of the sciences that are now prescribed for our course of study.

Dentistry is conceded to be a specialty of medicine by the broadest-minded men of that profession, and is recognized as such, I believe, by the American Medical Association. Of course I am aware that there are many medical practitioners who believe that all there is to dentistry is "plugging" and "pulling" teeth, and making rubber plates. You can usually size up the calibre of the M.D. who knows no more than that about our capabilities. He is usually the fellow who knows just enough medicine to give calomel when the tongue is badly coated, administer morphia when his patient is suffering intense pain, ask a few questions, grunt in order to prevent showing his ignorance, and prescribe some patent or

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pharmaceutical preparation because the manufacturer of it says it will cure colic or is good for rheumatism. He likes to take a "pull" at all the teeth he can get hold of just to show his patients he can "pull" them, or else test the dentist's skill by leaving the roots for him to extract. I do not believe the higher class of medical practitioners will take offence at what I have said, because they have men in their branch of the profession of whom they are just as much ashamed as we are of some in the branch which we represent.

Value of Knowledge of Chemistry.

A deeper and broader research and study of chemistry would not detract from our operative ability, but would materially enhance it, and would enable us to place our profession on a higher scientific plane, and command a greater respect from our brethren of the medical profession because of our ability as scientists.

Bacteriology, the use of the microscope, the study of histology, pathology, materia medica, and therapy are all better understood if we have a thorough knowledge of chemistry. Indeed it can not be dispensed with if we would really understand these other branches and give them practical application. I want to say, by way of parenthesis, that the discoveries which bacteriologists have made and are still making in reference to the causation of disease impose upon us the imperative duty of familiarizing ourselves with the bacteriology of the mouth, in order that we may pursue a scientific study of dental and oral diseases, and be capable of treating them intelligently and successfully. No fewer than one hundred different or apparently different forms and species of bacteria have been isolated from specimens procured from the human mouth, and we should acquaint ourselves with their study. To do this we must know what particular stains to use in the preparation of specimens, what chemicals best harden and preserve them, and how to make the different chemical tests to distinguish one bacillus from one another. This involves an adequate knowledge of chemistry. Only a few of these bacteria have yet been cultivated by artificial media, and the identity of many is very confusing. The profession awaits with interest the discoveries that may yet be made in this science. The question that confronts us is: Shall we, who are the most interested in these expositions, sit quietly by and expect others to do for us that which we should do for ourselves, and the doing of which would raise us greatly in the estimation of all educated people?

I am aware that this science is now being taught in our professional schools, but when many of us present were at college its value as a special study to the dentist was not recognized as it is to-day, and the germ theory was not so universally accepted. The young graduate, as he emerges from

the halls of his alma mater now, is thoroughly inoculated with this science, but we can not expect the infection to spread to the older men of the profession and our field of usefulness be improved, if they allow these germs of knowledge to be hermetically sealed from those influences and media that will increase not only the amount of knowledge they already possess, but disseminate it among others with ever increasing potency and usefulness. Neither can we, who had not the advantage of training in this branch, allow ourselves to become mere fungi and cling to others, deriving from them all our intellectual and scientific nourishment. We, too, have as our rightful heritage a part in this great work.

Dental and medical students, as a rule, look upon chemistry as a great bugaboo—something to be dreaded and something for which they expect to have no use in the coming years of an active practice. While it may not be so easily understood as some of our other branches of study, if we will but get the idea out of our minds that it is so very difficult to learn, and take up its study rid of all prejudice against it, I am sure it will prove very fascinating and profitable.

Early Methods of Embalmg.

It may be interesting to notice something of the history of this great science. Of all the nations of antiquity, the Egyptians appear to have had the greatest chemical knowledge. As far back as four thousand years before Christ, the art of embalming their dead was practiced by these people, the bodies of Cheops and Mycerinus and others of the age of the fourth dynasty having been subjected to embalming processes. The embalming of the body of the patriarch Jacob is one of the earliest recorded instances of the preservation of the human corpse on record, and the body of Joseph was thus prepared and transported out of Egypt. Three separate and distinct methods seem to have been employed, one for the rich, one for those with moderate means, and the third for the poor, thus showing that their knowledge of chemicals and their therapeutic action was not confined to any one substance. After removing the brain the bodies of the wealthy were prepared by “passing peculiar drugs through the nostrils into the cavities of the skull, rinsing the belly with palm wine, and filling it with resins, cassia, and other substances.” It was then steeped for seventy days in natron, which they obtained from margins of lakes by evaporation, and from the dried-up water-courses of Egypt. Natron, we find, is an impure sesquicarbonate of soda, and always contains sulphate of soda and chlorid of sodium. This substance either brought away or destroyed the viscera and soft portions, leaving only the cuticle and bones. The second process consisted of removing the brain, as in the first instance, but only injecting the viscera with kedron or cedar

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oil, and soaking the corpse in a solution of natron for seventy days. The dead bodies of the poor were washed in myrrh and simply salted for a period of seventy days. Other nations employed different means, but seem to have been less successful. The Persians employed wax; the Assyrians honey; the Jews embalmed the monarchs with spices, the body of Our Lord being anointed with them according to their own method of embalming. This art was never lost in Europe, several methods being recorded, but no essential chemical discovery for this purpose seems to have been made until the preservative property of mercuric chlorid was made known by Chaussier, in the seventeenth century. Later, in 1834, Grannal announced his discovery of the preservative power of a mixture of equal parts of acetate and chlorid of alumina. The properties of arsenic and pyroxilic spirit and the antiseptic nature of zinc chlorid were made known by Babbington and Rees in 1839.

Pulp Mummification.

Let us examine into the nature of some of these substances, because the alumina series of chemical compounds has a direct bearing on our own method of pulp mummification. Acetate of alumina is prepared by dissolving lead acetate and common alum in hot water separately, mixing the two solutions, and filtering off the insoluble lead sulphate which is formed. It is used very largely as a mordant by dyers, causing textiles to hold their color. The chlorid is obtained by heating a mixture of alumina and charcoal in a current of chlorine gas, and is used in the manufacture of the metal. Common alums are the most useful compounds of alumina, and are a series of double salts which aluminium sulphate forms with the alkaline sulphates. Alumen exsiccatum, with equal parts of zinc oxid and thymol, with glycerol and oil cassia q. s. to form a paste, is being used largely for the purpose of mummifying dental pulps. This process is called "foolishness" by some and a "Godsend" by others. Isn't it logical to say that if the Egyptians could preserve dead bodies containing the viscera by the application of palm wine, resins, cassia, etc., that we can to-day embalm the pulp with alumen, thymol, zinc oxid and cassia? Is the latter process to be considered impossible simply because it happens to be diametrically opposed to our former teachings that a dead pulp left in a tooth would putresce, mephitic gases be formed, setting up irritation that would be followed by inflammation and suppuration? Let us not be so foggy as to characterize this sort of treatment as foolishness and go to the extreme of asking our dental journal editors (as one man did recently) to keep all such "foolish" talk out of our periodicals. It is not foolishness, as he would have you believe, but it is the practical application of chemical knowledge obtained by experimentation.

Early Chemical Knowledge.

The Egyptians also fixed colors in silk by means of mordants, prepared many medicines and pigments, also soap, beer, vinegar, metals, and metallic alloys, sodium, chlorid, vitriol, soda, sal ammoniac, glass, enamel, tiles, and painted earthenware. The Chinese were also very early acquainted with the process of dyeing and the preparation of metallic alloys. They were also capable of manufacturing nitre, sulphur, gunpowder, borax, alum, porcelain, verdigris, paper, etc. The Greeks and Romans derived what chemical knowledge they possessed from the Egyptians, but added little or nothing to what was already known. The advancement of all science in Europe was stopped at the time of the overthrow of the Roman Empire.

Before the eighth century the prosecution of chemical knowledge was taken up by the Arabs, and researches were made by their scholars, the Alchemists, and by them was introduced into Spain, afterward being carried into other countries of Europe, where it "became speedily entangled with the fantastic subtleties of the scholastic philosophy." While they had many excusable errors in theory, the Arabs "were genuine practical chemists." They toiled at the art of making many medicines out of the various mixtures, and reactions of such chemicals as they knew. While they had their "mortars and pestles, their alembics and aludels, their vessels for infusion, for decoction, for cohabitation, for sublimation, for fixation, lixiviation, filtration, coagulation, etc., they labored with them, not with a view to discovering chemical properties of substances, but with only the hope of obtaining two great results—first, the secret of transmuting the baser metals into gold and silver, and, second, the means of indefinitely prolonging human life." It is to them, however, that we are indebted for our first work on this school, known as the *Summa Perfectionis*, composed by Cibber in the eighth century, and is consequently the oldest book on chemistry proper in the world. It is said to contain so much of what would sound to us like jargon, that Dr. Johnson ascribes the name of the word "gibberish" to the name of the compiler; and yet, "viewed in its own true light, it is a wonderful performance."

The term "amalgam" was first used by Thomas Aquinas in the twelfth century. Albertus Magnus during the same period introduced the use of symbols, and was very enthusiastic about the then new process of distilling spirits, declaring the spirit of wine to be the "very elixir of life." Basil Valentine, whose practical knowledge of chemistry was great, and who knew how to precipitate iron from solution, as well as many similar processes, ranks as the founder of analytical chemistry. He introduced antimony into medical use about 1394.

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While the labors of these alchemists have seemed to be but the "chasing of a will o' the wisp," and without any tangible results, there were some who were really meritorious, and to these we must give the credit of paving the way for genuine chemistry. It is interesting to observe that "the leading tenet in the alchemist's creed—the doctrine of the transmutability of other metals into gold and silver, a doctrine which it was thought at one time modern chemistry had exploded—receives not a little countenance from a variety of facts every day coming to light. The multitude of phenomena known to chemists under the name of allotropy," that is, the variation in physical properties shown by elements or their compounds without change of chemical composition, "are leading a speculative man more and more to the opinion that many substances hitherto considered chemically distinct are only the same substances under different conditions, or arrangement of their component molecules, and the number of really distinct elements may be few indeed."

Modern Chemistry. The first germs of a real science of chemistry appear about the end of the seventeenth and beginning of the eighteenth century, when Beecher, who "possessed an extensive knowledge of medicine, physics, and chemistry," promulgated the first theory of chemistry. He it was that first attempted to bring physics and chemistry into close relation, and sought to find the cause of all the inorganic phenomena in the world. By his investigations of the process of combustion, he enabled Stahl to announce his phlogistic theory some time later, which theory obtained universal acceptance until refuted and overthrown by Lavoisier. During the seventeenth century the science began to advance rapidly, and many important chemic laws were discovered. Geoffrey announced the first tables of affinities in 1718; Boerhaave published many original experiments on the chemical relations of heat and light in 1732; in 1724 and 1726, Hales and Black published, respectively, their researches on the air and aeriform bodies, differentiating carbonic acid evolved during fermentation, respiration, and by the action of acids on chalk, from atmospheric air. Alumina and magnesia were added to the then known earths, lime and silica, by Margraff in 1754-59, who also extracted sugar from plants. It was in 1770 that Priestley began making announcements of his discovery of oxygen, ammoniacal, hydrochloric, and sulphurous acid gases, etc.: and in 1773 to 1786, Scheele contributed chlorine, hydrofluoric, prussic, tartaric, and gallic acid, also baryta, phosphoric acid obtained from bones, and gave out the first hint regarding a new doctrine of combustion. About this time Bergman and Cavendish made additional contributions to the knowledge of gases. Between 1770 and 1794, Lavoisier reorganized much of the then known chemistry, "and founded a system of chemistry

which to-day remains as the framework of the science." Berthollet, in 1787, contributed much to the doctrine of affinity, and made researches in chlorine. Organic chemistry was advanced by Fourcroy and Vanquelin, and many contributions were given to mineral chemistry by Klaproth. Richter devoted himself to the doctrine of combining proportions, the atomic theory being afterward perfected by Dalton. Sir Humphrey Davy, and others, were led to make important researches in the metals and gases by the discovery of galvanic electricity by Galvani, and its further advancement by Volta. The knowledge of organic substances and chemical relations of heat was broadened by the work of Gay Lussac and Thenard, and Berzelius by his laborious researches in mineral chemistry "gave an exactness to this department which is an astonishment to the chemists of the present day." He was also the author of the electro-chemical theory, which has later been almost perfected by the labors of Faraday and others. In more recent years, organic chemistry has been very much advanced, and most rapidly too, through the labors of such men as Liebig, Whohler, Mulder, Laurent, and others, until to-day we have a science which seems so nearly perfect that we may feel there is nothing within its realms left for us to discover. Let us remember, however, that the summit of perfection was thought to have been reached some twelve hundred years ago. It may be after all that many important discoveries are yet to be made, and it is for us, as a profession and as individuals, to contribute our share of the brains, coupled with intelligent and well-directed effort to get out of the science by experiment and research any latent truths that may still be lurking within its mysterious confines.

**Dental Chemistry
and Remedies.**

I trust I have held your interest while recounting this bit of history. There is a broad field of labor for the dental chemist. The finding of an insoluble and durable dental cement is to the dentist to-day what the "Philosopher's stone" was to the alchemist centuries ago, and there is a greater chance of success in the discovery of this substance than was ever held out to those men.

There have been so many changes and additions in the latest United States Pharmacopoea, that, while they affect the physician and pharmacist more largely, are to a very great extent of interest to the scientific dentist. Permit me, then, to briefly review a few of them.

Because a large number of remedies, synthetic in their nature, having the same chemical identity and therapeutic action, were being marketed under various commercial names, it was thought best to give them official recognition, and names approximating as closely as possible their true chemical name or its synonym. This enables us to know the therapeutic action of these compounds by their chemical formulæ. Those

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remedies not having a definite chemical composition were given titles in harmony with general usage, and convenient for prescribing. "Aristol" has been admitted as *Thymolis Iodidum*, a name showing that it is an iodine compound of thymol. This method of using the true chemical name has been extended to a large number of preparations already official whenever practicable. "*Acidum carbolicum*" is no longer approved by these changes in chemical terminology, but we are to use the term "phenol" in its stead. The composition of "salol" is also shown by its new official name, "*Phenylis Salicylas*." *Extracta Fluida* now becomes *Fluidextracta*, written as one word.

The old teaching—that *-ic* acids make *-ate* salts and *-ous* acids make *-ite* salts—has undergone considerable transformation. As an instance of this, cocaine hydrochlorate is now called cocaine hydrochloride. Being desirous of learning why these changes in terminology were made, I wrote to Merck & Co., of New York, and quote you their letter bearing upon this subject *verbatim*:—

"As you are doubtless aware, there are two classes of salts, those in which the hydrogen of an acid is replaced by some metal or metallic radical; and secondly, those in which there is direct union between the acid and the base. For instance, in hydrochloric acid, the H may be replaced by, let us say, sodium, when we obtain sodium chloride, not hydrochlorate. On the other hand, when we combine an alkaloid, let us say quinine, with hydrochloric acid, we get quinine hydrochloride, not hydrochlorate, because this latter term can be considered as applicable only to the compound of quinine with chloric acid. To make the matter clear, it is merely necessary to state that the hydrogen in the HCl as well as the HClO_3 remains, and is not replaced by the quinine radical. The same applies to hydrobromic acid, hydriodic acid, etc. Consequently if we speak of quinine hydrochlorate, etc., we imply a compound of chloric acid, for example, $\text{C}_{20}\text{H}_{24}\text{N}_2\text{O}_2\text{HClO}_3$, and not the hydrochloride which has the formula $\text{C}_{20}\text{H}_{24}\text{N}_2\text{O}_2\text{HCl}$. Again, quinine chloride would have the composition $\text{C}_{20}\text{H}_{24}\text{N}_2\text{O}_2\text{Cl}$. Naturally, if the hydrogen remains attached to the quinine, the salt should rationally be considered a hydrochloride."

There have also been many changes in strengths of certain preparations, which, of course, affect their dosage. This has been for the purpose of making the different heroic remedies of uniform strengths in the pharmacopoeas of the different countries. Some have been increased and others diminished. Information regarding the different changes may be had by securing Bulletin No. 23 from the Hygienic Laboratory, Public Health and Marine Hospital Service of the United States, at Washington, D. C.

Since my subject was assigned me, I find that the section for which I am reporting includes therapeutics, and though I have been somewhat lengthy in my remarks, I shall close this paper with a few practical suggestions on the use of some remedies it has been my pleasure to exhibit, following the recommendation of other practitioners in several instances.

Dental Therapeutics.

In hemorrhages from tooth extraction, from the pulp or gingiva, during the preparation of roots and teeth for crowns, adrenalin chlorid applied on a pledget of cotton usually controls it readily. I never use Monsel's solution, or persulphate of iron, under any circumstances. Neither of them need ever be tried but once for this purpose to warrant condemnation by any one.

A recent writer advocates closing the apical foramen of teeth with a few fibers of cotton moistened with tincture iodine and then dipped in tannin, or tannic acid, as it is more commonly but erroneously called. He claims that the cotton would harden, thereby completely closing the foramen, and that the iodine and tannin would exert beneficial influences on the contents of the dentinal tubuli. In this connection I wish to say, I have found that this combination, on exposure to the air, does harden, and the iodine seems to lose its usual property of corroding steel, but in the light of the following experiment by Magitot, I believe this process should be more closely considered before using it:

"A tooth was placed in a solution of tannin, 1 to 100, the container hermetically sealed, and allowed to remain for two years. At the end of that time the enamel showed to have suffered no ill effects; it kept its polish, but was covered with a light deposit of greenish coloring matter. The cementum, however, 'showed marked softening, was easily penetrated by an excavator,' and assumed a light-brown color." I intended making some experiments to ascertain whether the combined action of iodine and tannin would affect tooth structure with tannin held in solution by tincture of iodine, and also the preparation recommended as before stated, but time forbade any definite conclusions in time for insertion in this paper.

We all have our cases of pyorrhea, and I presume most of us have accepted the uric acid theory as a cause for this disease. In troubles of this kind, after cleansing the teeth thoroughly, washing out pus cavities with hydrogen peroxid, I prescribe as a mouth wash "liquid antisepticus," and give internally thialion, a teaspoonful in cup of warm water three or four times a day, until catharsis is produced, then fewer doses per day Thialion is a laxative salt of lithia, and is very efficacious in all cases of uric acid excess.

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Thuja occidentalis has been recommended for the removal of epulidæ before they have reached the sarcomatous form. It is claimed that if the epulis be injected with this preparation two or three times a week it will frequently disappear.

I have tried Cataplasma Kaolini, a preparation of clay and glycerine, and which is marketed under the names of Antiphlogistine, Depletant, etc., in cases of incipient abscess, by applying it warm to the cheek of the patient, holding it in position with a surgical bandage, with gratifying results. Inflammation is usually reduced in this way and the abscess aborted.

Formalin in Pulp Canals.

Formalin, which is a forty per cent. solution of formaldehyde, may be used to advantage in treating putrescent pulps, but care should be exercised to prevent its coming in contact with the tissues of the mouth, on account of the intense burning sensation which it produces. You should also refrain from flooding the canals and attempt to dry out same with hot air, as the gas generated will cause considerable discomfort to the patient and yourself by inhalation and its irritating influence on the eyes.

Dr. Dorr presented his method of treating putrescent pulps in the April number of the *Dental Brief* with "solidified" formaldehyde, and, while I have not used this particular method, my experience with formalin leads me to accept his ideas as being perfectly correct. Briefly, his manner of operating is this: Where the pulp has putresced, open up the pulp chamber well, "clean out as much of the *debris* as possible, syringing frequently with tepid water, care being taken not to enter the canals." After drying the cavity, place a small piece of the formaldehyde in the pulp chamber, cover it with a pledget of cotton, and seal same with temporary stopping. Cement should not be used on account of its porosity. It may be necessary to place a particle of the preparation at the opening of each canal in multi-rooted teeth, before placing the final application in the pulp chamber. It may remain in the tooth from twenty-four hours to ten days, according to Dr. Dorr, without injurious effects, and when removed there is no longer any odor of putrescence, and no tenderness is found on percussing. The theory is that "there is enough heat and moisture in the tooth to liberate formaldehyde gas, which is forced into the pulp canals, thoroughly sterilizing all of the dead pulp tissue, together with the walls of the canals to the very apices, thereby eliminating all danger of infection of the regions beyond."

Chloral Hydrate.

A physician in my town recently called my attention to the very happy results he had obtained from the action of chloral hydrate for relief of pain after extraction of tooth by placing it in the dental socket.

This action of chloral, or its hydrate, is very probably due to the fact that it is decomposed by weak alkalies into chloroform and potassium formate. Normal blood being alkaline, as is also normal saliva, we can see why and how this reaction may occur.

I do not believe we dentists, as a rule, give enough attention to the diagnostic value of the study and examination of the oral secretions of our patients. Under the influence of pathological conditions during the continuance of general acute affections of the body, it has been shown by Magitot that immediate phenomena are produced, by reflex action, upon the mouth, which are more or less complete suppression of the salivary liquids, while there is at the same time an increased amount of mucous. The condition of the saliva is, in a very large measure, responsible for the condition of the teeth. I have just said that normal saliva is alkaline, but I do not mean to convey the idea that its reaction should show a super-alkaline condition.

I hope I have not wearied you, for while what I have had to say has been to some extent what the editor of the *Cosmos* would, perhaps, term "a repetition of history in dental literature," I appreciate the fact that these repetitions often impress the subject-matter upon our minds, and enable us to store it up for future use.

NOTE: In the preparation of this paper I have consulted the following authorities: Garretson's Oral Surgery, Marshall's Op. Den., Imperial Encyclopedia, U. S. Dispensatory, Roscoe's Chem., Mitchell's Chem., Simon's Chem., and Bulletin of Phar.

The New Era in Dental Prosthesis.

By DR. W. B. DILLS, Brooklyn, N. Y.

Read before the New Jersey State Dental Society, Asbury Park, N. J., July, 1906.

It is within a comparatively short time that the term "dental prosthesis," has applied to those branches of our art of a purely mechanical nature. The same might be said of the new era in dental prosthesis inasmuch as a large portion of the operations necessary for the preservation of the teeth have become part of the laboratory work. The placing of any filling in a tooth though it be accomplished entirely in the mouth is without doubt mechanical, though it has been included within the sphere of "operative dentistry." I feel that the day has arrived when the two have merged into one, hence the new era in dental prosthesis.

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I think it is a fact well recognized by many of our most prominent men, that the preservation of teeth is best accomplished by the making of the filling in the laboratory and cementing to place. I am not depreciating the skill possessed by thousands of our confrères but I do feel that we are living in a time which demands the abolishment of all unnecessary labor.

A careful survey of the patients who present themselves to you will show an average deterioration in work over that of twenty years ago. The people themselves will not give the time for protracted operations. It is a noticeable fact that parents that have submitted in the past to operations of from two to three hours each, will not permit their children to endure similar strain, and, as a consequence and in the natural evolution of all things, we have entered into this new era which promises to supplant all past methods.

**Advantages of
Cemented Fillings.** The advantages are many, such as the very large decrease in physical strain, both upon patient and operator. Second: The elimination of at least fifty per cent. in time. Third: The possibility of preserving much more fragile teeth substances than in any other way. Fourth: The elimination of a barbaric display. The fifth is a point which appeals to all of us. I would ask if it is possible under the old method or present method of plugging gold foil to acquire more than a bare competency. How many of our noted men in the past have left enough for the liquidation of their obligations? Why? Because the possibility of one pair of hands is limited, and unless the individual is shrewd and fortunate in outside investments, it is impossible for him to earn much more than that required for the maintenance of himself and family in a style and social position demanded by the public. The introduction of porcelain and gold inlays increases a dentist's earning ability three to five times as much for the reason that a large share of the work may be done by a mechanic in the laboratory, which gives the operator time to increase his income to about the proportion named; and I sincerely hope that methods may be devised simpler than those existing, to still enlarge these possibilities.

From a personal experience and an observation of that of others I am satisfied the public will pay proportionately very much more liberally for such service than for the old. Here are five points which if sustained must eliminate any possible argument against the general adoption of the new methods.

It is not my purpose to delineate positive or exact methods of procedure, but rather, if possible, to give you the benefit of a personal, practical and clinical experience in pursuing the general technic of

cavity preparation and mechanical procedure for the perfect inlay filling, I am not egotistical enough to believe that my method of procedure is the only one, but I am thoroughly convinced that the results obtained are beyond question equal to that of any known at the present writing. It is a well known and established fact, that complication in any operation is a barrier to its ultimate success notwithstanding which the multiplication or addition which is to follow make it the least in the selection of two evils.

**Inlay Methods
Compared.**

Let us take for instance the original procedure, that of burnishing the gold to the cavity to form a matrix for a porcelain inlay and admitting that the results are perfect we have a possibility of one perfect inlay filling, that is to say, in its adaptation to the cavity. If, by chance, which is often the case, the color is defective it is necessary to subject the patient to the discomfiture of having another matrix burnished to the cavity and the chances are even that the next one will be imperfect, which means if the color problem has been solved a probable remaking of three or four inlays before securing one of perfect adaptation. On the other hand with the impression method if the cavity is properly prepared and a perfect impression secured, and when I say a perfect impression I mean it literally, the operator is free to experiment in color and contour, without subjecting his patient to the discomfiture necessary under the old method.

There is another and very important factor in this connection, and that is the possible warping of the matrix in fusing the inlay the result of which is more than disagreeable to both patient and operator. On the other hand the impression method eliminates this entire proposition, and assures the operator of a result which is absolute and final; understanding, of course, that much is due to the proper preparation of cavities; but it is not my purpose to lay down fixed rules for cavity preparation.

**Cavity
Preparations
for Inlays.**

It is in self protection that I delineate the principles on which all cavities are formed to obtain a perfect impression. It might be said that the same care and precaution are necessary to obtain a matrix from a cavity direct, but a careful analysis of the two propositions will convince you that there is as much difference as there would be in placing a gold foil or amalgam filling. In either event the cavity must be so shaped as to permit a free draught, which in reality is the only point of similarity in the two methods.

In the original or burnished method, it is necessary to have excessive separation or sacrifice tooth structure unnecessarily; while with the

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impression method and proper cavity preparation there is no separation required other than for the ordinary gold or amalgam filling.

In the old days when gold foil was predominant tooth structure was sacrificed for its introduction regardless of its appearance. On the other hand, to-day, when porcelain is used to hide the art of the dentist every effort is made, or should be, to preserve as much as possible particularly on visible surfaces.

Let us take for example the cavities in the incisors or cuspids: if the preparation is made from the palatal or distal surfaces two very marked points or advantages have been gained. First, in appearance even though the color has been accurately matched there remains the all important or essential feature that the filling or inlay has the stress of mastication or wear in the direction of its maintenance in the cavity; and this is a rule that must be observed in the preparation of a cavity for a cemented filling whether it be porcelain or gold. This takes me back many years, not from personal experience but in reading and hearing older practitioners tell of their experiences in the cementation of not only gold but amalgam fillings, inserted without suitable anchorage, and later falling out to be reinserted with oxyphosphate cement, and lasting for many years.

I want it distinctly understood that I do not depreciate the value of gold or amalgam as a filling material, but I do just as distinctly want it understood that the possibility of saving teeth is one hundred per cent. better with a cemented filling than with the old methods. First, because the gold plug must have suitable anchorage or walls to sustain or maintain it; in other words, the tooth must hold the filling. The same can be said of amalgam or gutta percha. On the other hand any of the cemented fillings will support the tooth itself; frail or fragile walls can be made to last indefinitely. In other words, the procedure and results have been practically reversed and instead of the tooth holding the filling, we now make the filling hold the tooth.

I consider myself exceedingly fortunate that I have entered upon my professional career at the end of an old and well tried era and at the beginning of a new which promises more scientific results than had been supposed possible. With all due respect and appreciation for the skill and proficiency of my predecessors, I can but feel that the new era of "dental prosthesis" opens up a field which if intelligently pursued means the lifting up of dentistry to a plane beyond which there is no higher.

This brings us nearer to an exact science than was ever thought possible, and while there is bound to be an individuality in all operations, at the same time there are fixed laws of dynamics. It puts all men,

regardless of skill, practically on a level, not forgetting that dental pathology is an important factor and a line of demarkation in the success of a practitioner. Notwithstanding which the percentage of cases where pathology is a factor is small; the all important or prominent factor is a man's ability to save teeth by filling independent of any pathological condition. By this I mean that the mechanical or dynamic proposition is the all important, not depreciating the pathological condition that may exist and often does. There would be little or no success if the operator were deficient in knowledge of dynamics, while pathology plays a very important part in the successful practice of so-called "operative dentistry."

This brings us to a delineation of methods and procedure of technic in the preparation of cavities for the reception of inlays whether they be porcelain or gold. I claim no originality or priority in the following procedure but am giving what I have been able to compile from that of several or all of the conceptions of many good operators throughout the country.

There is one rule which must be observed in the preparation of a cavity, namely, that of a suitable draught whether it be for the impression or burnished method. Another is to preserve all of the tooth structure possible in the anterior or buccal surfaces. Color can be so closely matched that it is hard to detect a difference. Still the provisions of nature should be preserved wherever possible, for instance in the preparation of cavities on the approximal surfaces of the six anterior teeth even though the walls be thin and the ravages of decay extensive. The sacrifice of structure should be always upon the posterior or palatal surfaces and the formation of such cavities should be with a view to as nearly a mechanical retention as possible and here I make emphatic one of the most important features of inlay retention which is that of a body of cement sufficient for strength and adaptation; in other words a filling or inlay which fits or fills the cavity is not as serviceable nor can it be relied upon as well as one in which the inlay is perfectly adapted to the margins and a suitable or sufficient space is left for a body of cement in its adjustment.

I believe Dr. Jenkins advocates a perfect preparation of the cavity margin independent of the caries existing; and says that the matrix may be taken and later the cavity excavated, which provides for the space necessary in the cementation of the filling. This I take exception to, as there are cases when there are very fine veins of caries that might undermine or weaken margins. On the other hand if a cavity is thoroughly excavated the margins can just as satisfactorily be formed and if under-

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cuts or drags exist it is a very simple matter to fill in with gutta percha stopping to form a suitable draught for the securing of a perfect matrix or impression.

Summing up I find porcelain the nearest to an ideal filling of any that has yet been devised. That it is not applicable to all conditions is beyond question but where it fails gold is indicated. By this I mean gold inlays not gold foil; and as a finale I want to put myself on record as believing the only true filling is the one made out of the mouth and cemented to place.

Gold Inlay Methods.

A careful study of the different methods of making gold inlays, including those of Dr. Hinman, Dr. Nyman, and Dr. Wassel, has resolved itself into a method which I here give as the most practical and certainly simple for the restoration of lost tooth structure.

I have found that platinoid 28 or 30 gauge makes a most excellent cup or form for the retention of the impression material after preparing the tooth with suitable draft for an impression and the proper setting of an inlay. It can be easily cut to shape with an ordinary pair of scissors, and bent so as to conform to the contour of the particular requirements.

The "Perfection Compound" is used which is manufactured by the Detroit Dental Manufacturing Co. It is first rolled into pencil or stick form which permits of cutting after slight warming. The platinoid having been cut and bent it should be heated in the alcohol flames so that the compound can be made to adhere perfectly to its surface so that when withdrawing the impression they will come away together. In such cases that have been protected by the rubber dam the cavity should be coated with a thin vaseline that the cup and compound may be removed with a perfect assurance that after its solidification it may be removed with the slightest danger of any distortion.

Having secured an accurate impression in this way the same is invested in plaster the surfaces of which are exposed that amalgam may be packed and burnished into the mold, producing a practically perfect reproduction of the cavity. The amalgam should be mixed thin and the mercury worked out, as you are filling in the mold, and allowed to stand over night. This amalgam die is taken out of the plaster and imbedded in a composition called "Dental Lac," contained in one of the cups of the Brewster water press.

Now adjust a piece of pure gold 34 gauge over the die, and press it down into the cavity with a piece of spunk and burnish. Take it out, trim and anneal it and replace on the amalgam die. Put a piece of spunk in the center and place in the swedger and swedge and trim to about 1 mm. of cavity margin and anneal and reswedge. Fill the matrix with any quick

setting cement. After filling matrix with cement put in the mouth and instruct patient to bite while the cement is still soft. Take out and trim to occlusion and contour, and around the edge trim below the enamel margin, about the depth of the thickness of the piece of gold that you are to swedge for the top piece. Replace on amalgam die and swedge the top piece of 36 gauge pure gold; trim away to the line where you are to unite the two pieces and anneal and reswedge.

I now separate the two pieces and usually find upon tapping the matrix that the cement will drop out very readily; if not catch the matrix with the foil-carriers and tap them once or twice. The cement will drop out whole so that you can have it at any time to straighten out the matrix if distorted in any manner.

I cut from the matrix a half or a little more out of its center keeping equally away from its margin in accordance with the shape of the cavity. In cutting out this hole, I may distort the matrix somewhat. If so I anneal it and replace into amalgam die and burnish well to place, reswedge and unite the two pieces over the Bunson flame at one point only with 22K. solder and a little powdered borax. Try it in the amalgam die and see that the two pieces have a close contact all around. Then finish with 22K. and fill in with any lower karat solder leaving enough space inside to act as an under-cut in retaining the filling. Set in the tooth and allow cement to harden.

All the finishing is done with the exception of running a disk over the edges and polishing with a brush wheel.

“Cements.”

By ROBERT HOMER WELSH, D.D.S., New Orleans, La.

Read before the Louisiana Chapter, Interstate Dental Fraternity, November, 1906.

In my investigation of the subject I was greatly surprised to find that the cements we use have been subjected to very much less thorough scientific investigation than the importance of the subject warrants. I found few articles on the subject and these by a few authors who seem to do all the writing and investigating. A fact that we all agree on, is that cements are not what they should be and but few if any are trying to make them better except one or two enterprising manufacturers. That cements as we now have them possess in many respects valuable qualities as filling materials there can be no doubt. When the ideal cement is known we will find it neither expands nor contracts, that

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it is impervious and resistant to oral fluids; that it withstands attrition; that it neither attacks the substance of the tooth nor exercises any irritating influence on the pulp tissues; that it will be in color and translucency similar to the teeth; that it will be quick setting and easy of manipulation and perfectly hydraulic. Can you picture for a moment the effect of such a filling material on the practice of dentistry?

Composition of Cements.

The only solvent for oxide of zinc which gives anything like desirable results is phosphoric acid. This acid exists in three forms, viz.: ortho, pyro, and meta-phosphoric acid. As ortho-phosphoric is the one yielding the most enduring metal salts it is the most suitable for our purpose and probably all the modern or recent cement productions are modifications of the simple formula of this acid in combination with zinc oxide. In the past the modifications of ortho-phosphoric acid were generally produced by the addition of certain definite quantities of the meta or pyro-phosphoric acid for the purpose of retarding the setting and diminishing the production of heat caused by the reaction. The addition of meta-phosphoric acid to ortho-phosphoric acid is to be condemned since true meta-phosphoric acid can be maintained in a liquid state only by the addition of alkaline phosphates which in themselves are soluble in normal saliva. Hence the rapid disintegration observed in some of the early makes of cement, some of which are still on the market. The more scientific and modern productions of the necessary modifications of ortho-phosphoric are produced by a partial saturation of the acid, by oxides and non-alkaline phosphates. The powder is composed of pure zinc oxide pigmented to the desired color with the various metallic oxides and should be ground to a very great degree of fineness.

Uses of Cements.

The different uses that we may make of cement are too numerous to mention. It is used to start gold fillings and retain the gold while packing; when mixed very thin, it is valuable in repairing plaster models; for setting inlays, in which case, finely ground powders should be used as they make closer joints and crystallize more quickly; as an intermediate under metal fillings; supporting frail tooth walls; setting crowns, bridges, etc. In those conditions which we meet, where cement is occasionally indicated either through lack of time or inability of the patient to submit to permanent operations, our method of cavity preparation is entirely different from that of permanent work. We leave all frail and overhanging walls and perhaps a small portion of infected although not *softened* dentine. The cavity under these conditions should, of course, be sterilized with a cauterizing, non-staining disinfectant, such as colorless tri-cresol and formalin, equal parts, it being understood,

of course, that all traces of this solution are to be removed from the cavity either by applications of hot air or repeated washings with distilled water before the cement is inserted.

The placing of silver nitrate under cement seems to impart hardening or preserving qualities on the cement while not interfering with its adhesive qualities; at the same time it retards or prevents future decay of tooth structure; therefore I consider it advisable wherever discoloration is not objectionable to apply it before inserting the cement, the percentage of solution varying according to nearness of pulp.

Zinc oxy-chlorides are not generally used because of their slow setting properties and lack of resistance to attrition. Straight zinc oxy-chloride is valuable as an intermediate under metal filling, for its therapeutic properties, it being my unvarying custom to use it over root fillings of all descriptions.

**Manipulation
of Cements.**

An excellent method of adapting cement to the cavity walls is to take a small bit of the mix at the thick, creamy, or crown-setting stage, and line the walls, which can be easily done, as at this stage it almost flows to place; the rest must be mixed as stiff as possible.

When this stiff mix is packed in it displaces most of the thinner mix thereby assuring perfect adaptation. This I consider a very important point, as very often, when inserting a filling, the cement is inadvertently pulled away from the bottom of the cavity, or margins of same, with instruments, especially cement mixed to the creamy consistency. In setting dowel crowns we find gelatine tubes a valuable adjunct in carrying the cement to the end of the canal. In placing cement in fine canals a small loop on the end of broach will be found to carry the globules to the end better than any other method. To overcome the reflection of inharmonious colors of cement through translucent enamel the lighter colors of the powder may be pigmented with metallic oxide to give the desired tint, as for example, a light gray may be dark in proportion to the quantity of copper oxide used.

**Undesirable
Properties of
Cements.**

When properly mixed I do not consider cement dangerous to the pulp; our trouble usually comes from an excess of acid and nearness to pulp. It has been claimed, that the natural condition of the pulp is alkaline and when fluid is placed on the other end of the dentinal tubuli you produce an inward osmosis; so that the phosphoric acid reaches the pulp chamber and that this produces irritation and death, faulty manipulation or mixing, causing the unnecessary excess of liquid. It is claimed, that this can be avoided by lining the cavity with varnish or gutta percha in solution, but at a sacrifice of the adhesive

ITEMS OF INTEREST

properties of the cement. Nearly all commercial preparations of zinc oxide contain arsenic, this latter agent being constantly associated with zinc ores in nature; but it is claimed by the manufacturers that the high heat to which they are subjected in the calcination process causes the arsenic to enter into combination with the zinc forming zinc arsenite, rendering the arsenic inert.

Pain in inserting will usually be in proportion to quantity of fluid in mix, but in quick setting kind is increased by the heat generated in chemical union or crystallization. We must not expect too much from cement, we should use it with discretion, not abuse it, and not fill over decalcified dentine, expecting it to do impossibilities.

Method of Mixing Cement.

There should be just enough powder added in small portions to the liquid, thoroughly spatulating each portion until a homogeneous mass is formed. For fillings it is best to mix as stiff as possible; for crowns, bridges and inlays, as stiff as will permit of the piece going to place. Too little spatulation gives a quick setting granular result and over spatulation gives a cement which will never properly crystalize. All cements have their peculiarities, and before any one is used a perfect comprehension should be had of all its peculiarities, by experimentation, out of the mouth. The method of incorporating as much powder as possible in an effort to produce a very stiff or putty like mix that can be kneaded between the fingers is to be condemned not only from the fact that an imperfect mix is obtained but water of crystallization will be absorbed during contact with the fingers.

Using a flat-sided bottle filled with either hot or cold water for the purpose of retarding or hastening the setting of a mix is to be heartily condemned for the same reason given above, that is, absorption of water of crystallization.

In mixing cements I have found a large porcelain slab, in combination with a large, thick, almost convex shaped metal spatula, best adapted for the purpose.

The slab and spatula should be immaculately clean before commencing a mix; if for no other reason than the fact that one crystal of a kind will hasten the formation of other crystals, thereby in the end, ruining or very much impairing the usefulness of the cement after mixing.

Setting Qualities of Cement.

The fineness or coarseness of a given powder decides or fixes the rapidity of setting. A coarse powder with a given phosphoric acid will be slow of setting and the same powder reduced to a finer state will set more quickly in proportion to fineness for the simple reason that there is more surface of the oxide granule exposed to the

action of the acid. Pigmenting with the metallic oxides to change the color retards the setting in proportion to quantity used. Thin liquid gives quick setting properties and is best suited to a dry, cool atmosphere; and the slower setting or thicker liquid is best adapted to a tropical atmosphere.

Preservation of Cement.

The tendency of phosphoric acid to crystallization in a dry, warm atmosphere and to absorb water in a humid atmosphere is so great that it calls for much care in its handling during consumption. We should keep our liquid for daily use separate from the supply bottle, and the best way to keep it is tightly stoppered in the S. S. W. office preparation bottle, No. 6. Vaseline the joint, thus rendering it air tight and making removal of cap always easy. The liquid may be easily removed by the use of an Ames dropper, made to keep in the bottle and great care should be exercised not to get any liquid around the joint.

Spatulas.

Non-corrosive spatulas should be used, preferably those made of high grade German silver; and I dare say, these are more widely used than any other, but they offer a serious objection owing to the proportion of nickel and zinc and sometimes iron used in their manufacture; all these metals are easily acted upon by the acid of the mix and therefore become very detrimental to same. It seems to me that if we are to use a metal spatula, one made of iridio-platinum is the best combination for this purpose and when the blade is so made that it can be fitted into a socket handle is not necessarily too expensive, especially when we consider the lasting qualities and results to be obtained.

For mixes, when a slight modification of color is not objectionable, spatulas made of silver and copper alloy combined to give the maximum rigidity and hardness would be beneficial from a chemical standpoint supposing that a slight abrasion and chemical action should occur, thus producing phosphates of these metals which have a salutary effect, whereas *phosphates of iron and nickel* which are necessarily formed when a *steel* spatula is used are very detrimental.

Bone spatulas are to be condemned as the bone grinds off and becomes part of the mix. I have used spatulas made of thick orangewood or other non-porous wood where I was particularly anxious not to change the color of a mix, I must say, with much satisfaction. However, this method is not to be recommended for general use as I do not think we can get as thorough spatulation as when a metal spatula is used. I am now using an agate spatula and an onyx slab and can feel sure that my mix is not contaminated.

Slabs. Glass slabs are not advisable for the reason that in a short time after using them their surface becomes rough due to the wearing away of same during the process of mixing, the small particles at the same time incorporating themselves with the mix. Oiled paper has many disadvantages as a surface to mix cement upon, hence this method is to be condemned.

For general use a large porcelain slab at least six inches square and one-eighth to one-quarter inch thick that has been especially glazed on the surface will be found most satisfactory. The writer has just commenced to use an agate slab and believes that he will have perfection in its use.

When cements are chemically pure and mixed in the right proportion there is but slight disintegration caused by saliva. When disintegration is most marked we find an acid condition of the saliva.

Oxyphosphate of Copper. Of oxy-phosphate of copper Ames says we find characteristics peculiar to the material and differing from zinc oxide cements; for instance, that the maximum density is obtained from a creamy mix rather than from a stiff or putty like mix as is the case with the zinc oxy-phosphate. With these cements there is obtained a decided embalming effect of semi-decalcified dentine and of thoroughly decalcified dentine which is peculiar to copper salts. These materials are extremely bland when used near the pulp or in contact with gum tissue, and seem to have a very salutary effect upon inflamed pulp or gum tissue, but they cause severe pain to both at first contact. Treating a large buccal cavity for instance, into which the gum has over-lapped and become angry and ragged the gum will shrink away, and take on a condition where it is rather difficult to start a hemorrhage. You really have to lacerate the tissue before there will be a flow of blood and the effect of the contact with gum tissue is such that in a multi-rooted tooth where there has been extreme recession of the gum and a pocket at the bifurcation of the roots this space can be literally filled with the straight "original" oxy-phosphate of copper and cause a shrinking of the tissue, and also the correction of the tendency to suppuration to such an extent that the tissue becomes healthy and suppuration ceases. Many cases of active pyorrhea have been cured by this simple method. The material has the property of taking up a slight trace of moisture which may be present and will adhere to a plain surface after being made only reasonably dry doing away with the necessity of undercuts entirely.

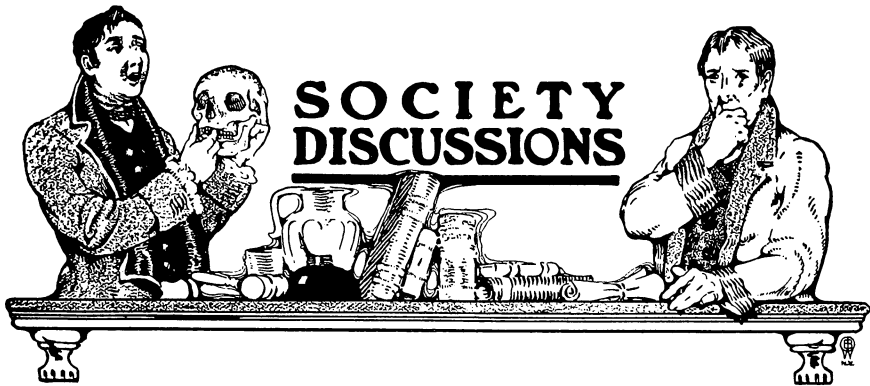
It is especially useful for filling the open fissures of newly erupted permanent teeth, that is, first, second, or third molars, which can be done

with very little preparation and is a most useful material for filling cavities in deciduous teeth because of its embalming properties and because a trace of moisture will not interfere with its adhesion. The setting process is so rapid when it is properly mixed that submersion soon after insertion does no damage.

Many other uses might be mentioned, so many, that to me and to others it has seemed that if it were not for the color of these materials there would be little excuse for any other cements.

I lay claim to no originality in this paper, I am indebted to many writers in our dental journals and especially to Dr. W. V-B. Ames, of Chicago.





New Jersey State Dental Society, Thirty-sixth Annual Meeting.

Discussion of Dr. Dills's Paper.

Dr. Stockton. I certainly am very grateful to Dr. Dills for his very able paper and for the central thought in it, that the ideal filling of the future is to be a porcelain or gold inlay cemented in. It appeals very strongly to the operator and more strongly to the patient. Many of you who are enthusiasts, after starting a filling have had your enthusiasm grow until after a little while you were so wrapped up in the beautiful work you were doing and which you pictured in your minds' eye, that you utterly forgot the patient. I have in mind now a lady (I am glad to say a patient of another enthusiast and not of myself), whose health I fear has been permanently destroyed by the enthusiasm of her dentist; he kept on filling and filling teeth and making appointment after appointment until to-day, through the nervous strain of it all, that lady has been compelled to break up her home and go to a sanitarium. Her husband told me they were almost afraid her mind is permanently impaired. The dentist forgot everybody but himself; his idea of the beautiful filling was before his mind and all thought of the patient was gone for the time being.

Dr. Chase. Like Dr. Stockton I have nothing but praise for Dr. Dills's able paper. He has shown us an easy method of doing what were formerly regarded as very hard operations in putting in gold fillings. He has described an operation not only easy for the dentist but for the patient, and he has struck the keynote in speaking of inlays; inlays are not on the wane but on the increase. Also he struck the keynote in speaking of the care of our patients and the ease with which we can operate for them; the less

pain, the less discomfort we give our patients the better they will like us and the more patients we will have. Not only that but it will not decrease the fees that we receive; on the contrary it will increase them. And we will not be breaking down early in life through doing large contour gold operations, finishing them up, making all of them like pieces of jewelry. You have seen the consequences as Dr. Stockton has pictured them to you of doing these operations so thoroughly.

I desire to thank the Doctor personally and to assure him he has given me ideas which I will try and profit by.

I would like to say I have used this method very extensively and while I differ with the essayist a little as to the technique the results have been very satisfactory. Gold inlays are indicated in molars where you must insert a large filling. Very frequently you have patients whose mouths are filled with very beautiful work but the molars are so much decayed that you are forced to use amalgam. That is where these large gold inlays are indicated and you get very satisfactory results. They will stand the strain of mastication and the cement which is used to hold the filling in is a support to the tooth. You ordinarily put a little plug like an amalgam filling or a built-up gold filling in the tooth and while it stops up the hole it does not support the tooth.

I depend very largely on burnishing the matrix in; I get a very accurate matrix and I think it is a little quicker because I do not have to wait over night for my amalgam to set. While my method is not so exact as that of the essayist it is sufficient for me to burnish the original matrix into the tooth with substantial accuracy and I do that at the first sitting and have the patient come back for the second part of the operation at another sitting and am able to put them in in two sittings.

I am one of those who listen to these various theories with a great deal of enjoyment but I have been during the last three or four months a little doubtful of my own ability to construct such work. I recognize more fully the fact that something in that line must be done and the feature which attracts me more forcibly is the point which my friend Dr. Stockton has brought out concerning the welfare of our patrons. On the other hand every man who is conscientious in his professional life must ignore his own love of his own personal technique or the love of the old gold fillings which so many of our old men so truly love and it seems to me these changes are robbing them of one of the pleasures of their lives. Only a little while ago I was speaking to a man who has a wonderful faculty in the construction of gold fillings and to him it is like taking away a well beloved child; but on the other hand we must sacrifice every-

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thing that is part of ourselves to the great wave of improvement that is flowing over our profession. I recognize that there is much in the strength that inlays afford and much satisfaction in knowing they will exist for years with good serviceable work.

If I might be permitted I would like to say that I believe in this class of work; but in every field of dentistry we seem to have too much divergence of opinion. You will find in every profession, in law or in any of the various walks of life there seems to be more or less one accord in the way things should be done; in our profession we seem to be lacking in that power to organize, to amalgamate and perform some definite thing which answers the purpose better than the countless things that are springing up every day—each man an author of his own theory and fighting for it. We should be pliable and recognize the good things and if there is the least thing that is important it is worthy of ourselves to come forward and give the author the credit for it and bury our own ideas if necessary in doing so. In many other great works men who are seeking for the welfare of the earth at large are narrowing down to one or two ways of doing things, while we have a thousand and one ways of doing things and the result is that the men who are conscientious and striving for the good of humanity are wasting time in investigating these various methods. Let us find out what is best and then walk along that pathway until we have the pleasure of seeing the theory carried to perfection.

I feel very fortunate in having heard this paper and I can promise the essayist that I will indulge in his practices, feeling conscious that I shall be rewarded for my efforts along those lines.

Those of us who have good ideas should be
Dr. Wm. Trueman. willing to share them with others and we should
be very much like the street cars that always have
room for one more.

I criticise the first paragraph of the paper where the writer suggests the term "prosthetic dentistry" for this kind of work. I think that is not correct; we should confine that entirely to replacing the natural organs and not to their repair, so as to avoid confusion in our already very much confused nomenclature. For a century or more the term "prosthetic" has been applied to replacement and not to repair.

In regard to the special method, that is a matter which depends a great deal on personal preference; we all have our own little ideas. I have used this method of taking impressions with great success, yet I recognize that every time you take an impression and make a cast with that impression you introduce a new opportunity to make a mistake or

an error. I prefer in all cases whenever I can to get just as close as possible to the cavity; nevertheless there are places where we can do better by taking an impression.

Another point comes up in my mind—we are getting away from the old method of protecting the patient. I had a little experience with Dr. Marshall; I was in his office nearly an entire week having four teeth filled and at the end of that time was very nearly on the verge of nervous prostration, and it took a week or so to get over it; we are getting away from the idea of considering the patient, more and more.

We all seem to consider these inlays as something new, nevertheless we have records showing they were used as early as 1837 by a dentist in London who published his method of making them and spoke of it very highly for use in a great many cases. The method of making gold inlays practiced now probably had its first conception in a paper read before the Pennsylvania Dental Society in 1876 by Dr. B. J. Bing. He was on the programme to show how large gold fillings could be made in one minute and the announcement seemed to be taken as a joke. He could take a joke as well as the next fellow but he didn't like it, and I think we make a mistake sometimes when things appear on the programme or brought out in a paper that do not agree with our ideas, in treating them lightly. The Doctor was very much provoked and shortened his demonstration as much as he could. He made in his laboratory little pieces of gold and when a patient presented a large filling where he thought one could be used he fitted it into the cavity, not into the body of the cavity as we do to-day but on the outer surface, burnishing and so forth to make it fit, filling the cavity with gutta percha and then putting the gold into position. As soon as he made this explanation we all thought it was a very good idea and many of us adopted it in cases where we found it useful. We found, however, that they did not last. In my own experience all I put in by that method came out except one. That was in a cuspid cavity on the approximal surface, and some ten years after it was put in I believe it came under the notice of another dentist who tried to learn how it was inserted but could not understand it until he came to replace it some years afterwards when he was surprised to find just what the condition was. So the idea was suggested at that time. The difficulty was that gutta percha is in the habit of expanding and there was nothing to hold the edges of the gold veneer in place. But we have now fitted the inlay to the cavity and made the line of cement so thin that it is not likely to wear out in a very short time. So I think these inlays have come to stay, and after the pendulum has swung back and forth two or three times we shall find out where to use them and where not to use them.

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I compliment the essayist on the paper ; it is practical and suggestive and has new ideas and we want all the new ideas we can possibly get.

I do not think there is much to say further but
Dr. Dills. I thank those who discussed my paper and particularly Doctors Stockton and Chase.

Dr. Schamberg said that his method was such that he finished with the patient in two sittings ; I do the same thing ; my usual procedure is to take an impression and fill the cavity temporarily and make a future appointment. In the mean time the impressions taken during the day are turned over to the laboratory man who leaves them until the last thing before he goes at night, when he invests them and fills them in and the next morning they are ready to go to work to make porcelain or gold inlays, whatever they may be, and he will usually guess at the contour of a gold inlay and leave it until the patient comes in and if there is too high occlusion or too much contour it is reduced ; he takes it to the laboratory while the patient is there and finishes it up and in about ten minutes he brings in the inlay and I try it in the mouth and have the patient bite ; if there is anything wrong in the occlusion it will appear then ; then it is taken back to the laboratory and filled in.

With regard to Dr. Trueman's criticism of the title of the paper, I believe I looked it up in Webster's Dictionary and found that "prosthetics" is the restoration of a part lost ; we are restoring an organ and he says we are repairing—but that is a matter of opinion.





A Corporation not a Dentist.

In the department of Dental Laws and Licenses will be found a report of a decision by Judge Taylor, of St. Louis, which promises to be of the greatest importance, as a lever with which to eradicate the worst class of dental parlors, viz.: those owned and operated by men who personally have no skill as dentists.

We have a right to expect a graduate dentist to take some pride in the profession which he enters, and to hold sacred her honor and reputation, and it is bad enough when such men disgrace their calling with charlatanism. But what are we to hope for from a man, who is not a dentist himself, but merely uses his capital as a means of setting up a shop, into which he lures the unwary on the pretense of supplying skilled dental services "with an expert or specialist in every department?" This sort of fellow enters dentistry as a business proposition. He opens his "dental parlors" just as any shopkeeper opens a shop. And he hires young graduates to work for him, exactly as the shopman hires clerks to sell goods. The proprietors of these places owe allegiance to no college, preceptor, nor previous vows to uphold and uplift the dignity of dentistry.

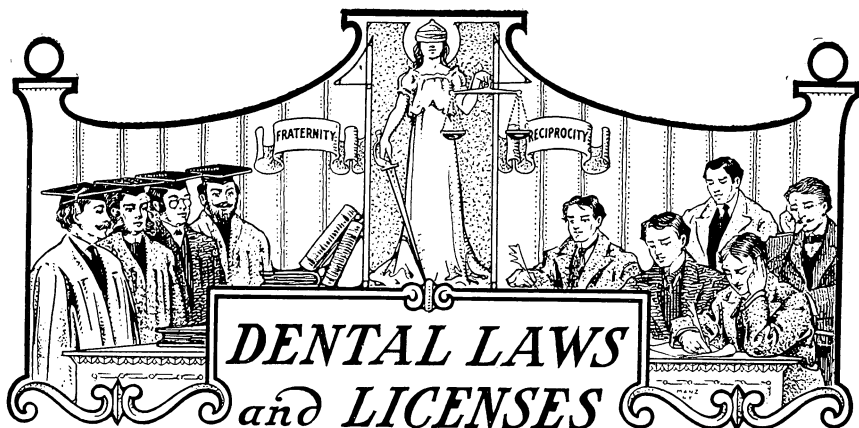
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It has been exactly these men who have been the hardest to reach legally in the experience of every appointed dental law committee throughout the Union. They not only have money, but usually what in this country is so aptly termed "political pull."

At length, however, comes a wise judge to supply us with a just precedent. Judge Taylor declares that a corporation is created to do business; that dentistry is not a business, but a profession; and that consequently a corporation can not practice dentistry. Judge Taylor's logic seems unassailable, and his argument is especially apt where he points out that it is the vested right of the individual to engage in any business that he may choose, but that it is totally different with the professions, since the statutes provide that none may practice a profession until qualified by passing an examination which tests his knowledge and his capabilities. Thus a sharp line is drawn between business and a profession, which leads to the logical deduction that a profession may not be engaged in by a corporation which is a business body.

Much credit is due to the Board of Examiners of the State of Missouri for raising this issue and obtaining this judicial decision, which should be as promptly as possible applied in other States, notably in Illinois and New York, where a dental corporation is doing a tremendous business with the aid of flamboyant advertisements. It is noteworthy in passing that this corporation is using the name of its originator, a gentleman now "serving" his own State by the compulsion of its law officers.





Corporations May Not Practice Dentistry.

The following decision was handed down by Judge Taylor, of the St. Louis Circuit Court, in an action brought by the State Board of Dental Examiners for the State of Missouri, to determine whether or not an incorporated body has the right to practice dentistry. The decision is a strong one and clearly holds that the State can not authorize a corporation to practice any of the learned professions. This will put the National Dental Parlors and all similar corporations out of business in the State of Missouri.

Opinion of Judge Taylor.

In the Tarr case the respondents are officers or stockholders of the "National Dental Parlors," and are charged by the information with having for "several years last past assumed, usurped and unlawfully exercised the privileges of an incorporation under the name of the 'National Dental Parlors,'" and with having unlawfully claimed the right as a corporation under that name to engage in the general practice of dentistry in the City of St. Louis.

By their return made to the order of this court on them, the respondents, Tarr & Tarr, admit that they are practicing dentistry in the City of St. Louis, under the name of National Dental Parlors and claim the right to continue to do so by virtue of a certificate of incorporation issued to certain of their predecessors in interest on January 15th, 1898, by the Secretary of the State of Missouri, based upon the Articles of Association, which stated the purpose of the corporation to be for "the general practice of dental surgery in the City of St. Louis." To this return the

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relator has interposed a demurrer. This brings directly before the Court the question of the power of the Secretary of State to issue a certificate of incorporation to an association formed for the purpose of practicing dental surgery—the question of the validity of the certificate issued to the corporation controlled by respondents. This question never having been passed upon by our Appellate Courts leaves this tribunal free to pass upon it without any controlling opinion upon the subject.

If any authority exists for the creation of a corporation such as this one now in question, it must be found in section 1319 of Chapter 12, Article 9 of the R. S. of Missouri, 1899, under the General Heading of "Manufacturing and Business Companies." That section enumerates ten specific purposes for which corporations may be organized, none of which directly nor by implication covers the practice of dentistry or medicine, while an 11th paragraph of this section provides that corporations may be formed "for any other purpose, intended for pecuniary profit or gain not otherwise especially provided for and not inconsistent with the constitution and laws of this State." Respondents must find their right to enjoy the privilege of a corporation here or not at all. Did the legislature intend to include in this broad language the practice of dentistry? The old rule governing the interpretation of statutes founded upon the doctrine of *ejusdem generis* has been, so far as this particular section of the statute is concerned, practically abolished by the rule laid down in the case of *State ex rel. Walker*, 123 Mo., 56, so that no limitation is to be placed upon the language of paragraph 11 by the other paragraphs preceding it in which are specified certain purposes for which corporations may be organized. However, when we read the title of the article in which this section is found—"Manufacturing and Business Companies"—and then glance at these specially designated and mentioned purposes we fall naturally into the use of the generally accepted descriptive name or classification of all corporations organized under this law—"business corporations"—and a reading of the whole chapter leads to the conclusion that while in the above quoted paragraph are found the words "for any other purpose," the real intent and meaning of these words is "for any other business purpose."

While in the earlier days the practice of dentistry may not have been regarded as one of the learned professions, it certainly is so regarded to-day, and it now takes rank with the professions of medicine and law, and it is not likely that the legislature intended to rob it of this dignity nor to have it classed as a business. There may be lines where the practice of the learned professions and business in its general accepted sense seem to cross; there may be unworthy

**Legal Difference
Between Business
and Professions.**



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members of these professions who conduct themselves as if engaged in business—who even so regard themselves—yet, between the two callings there is a fundamental difference—a difference recognized not alone by men generally but by the law as well. A citizen under our laws has the vested right to engage in any business he may choose which is not prohibited by some special law, and which is not opposed to public policy. Not so with the practice of the learned professions—this is a privilege conferred by specific state license only after examination upon those who possess the standard of fitness, skill and qualification fixed by the State; this distinction is made as the only practical method of protecting the people in their health and life, and in certain situations their property rights, from ignorant pretenders; nor does the fact that these pretenders sometimes obtain these licenses and so engage under the protection of the law in the practice of the professions alter the attitude of the law or cause it to depart from this wholesome rule or principle. (State vs. Davis, 92 S. W., 484.) By the various enactments intended to regulate the practice of dentistry requiring that applicants for licenses shall be of good moral character and shall undergo an examination, the legislature has provided a comprehensive and complete plan or scheme governing this calling in this State, which clearly contemplates personal qualifications and personal responsibility in a manner and to a degree utterly inconsistent with the idea that a corporation should be authorized to engage in the “general practice of dental surgery.”

For the reason above indicated the demurrer to the respondents return will be sustained.





SOCIETY ANNOUNCEMENTS

National Society Meetings.

National Association of Dental Examiners,
Minneapolis, Minn., July 26, 27, 28.

National Dental Association, Minneapolis,
Minn., July 30.

State Society Meetings.

Alabama Dental Association, Birmingham, May 14, 15, 16, 17.

Arkansas State Dental Association, Eureka Springs, May 29, 30, 31.

Connecticut State Dental Association, New London, April 16, 17.

Florida State Dental Society, Atlantic Beach, June 6, 7, 8.

Georgia State Dental Society, Atlanta, May 7, 8, 9, 10.

Illinois State Dental Society, Quincy, May 14, 15, 16, 17.

Maine Dental Society, July 16.

Minnesota State Dental Association, Minneapolis, July 30, Aug. 3.

Montana State Dental Society, Helena, April 12, 13.

Nebraska State Dental Society, Lincoln, May 21, 22, 23.

New Jersey State Dental Society, Asbury Park, July 17, 18, 19.

New York State Dental Society, Albany, May 10, 11.

South Carolina State Dental Association, Anderson.

Vermont State Dental Society, Burlington, May 15.

Virginia State Dental Association, Jamestown, Sept. 10, 11, 12.

Wisconsin State Dental Society, La Crosse, July 16, 17, 18.



National Association of Dental Examiners.

The National Association of Dental Examiners will hold their Twenty-fifth Annual Meeting in Minneapolis, Minn., beginning Friday, July 26, and continue through the 27th and 29th.

Accommodations have been secured at the leading hotel of Minneapolis, "The West Hotel." Rates as follows: Room without bath \$1.00 per day for each person occupying the room. Room with bath, \$2.00 per day for one person and \$1.50 per day for each additional person in room. Hotel on European plan. Any room in the hotel capable of accommodating two people. Telephone in each room; hot and cold water. A large attendance of delegates is earnestly requested. Committee on Colleges, Joint Conference Committee, Tabulation of Examining Boards reports, the Committee for promoting a system of credits and uniformity of Examinations will all give exceedingly interesting reports, valuable to all the members of the Association. Railroad rates will be announced later.

For information apply to Charles A. Meeker, D.D.S., secretary and treasurer, 29 Fulton Street, Newark, N. J.

New Jersey State Board of Registration and Examination in Dentistry.

The New Jersey State Board of Registration and Examination will hold its Semi-annual Meeting beginning Monday, July 8, 9, 10, and 11, in the Assembly Chamber of the State House at Trenton, N. J.

For information kindly apply to the secretary.

A photograph of the applicant must be filed with the application.

Practical and theoretical work completed at the session.

CHARLES A. MEEKER, D.D.S.,

Secretary of Dental Commission.

29 Fulton Street, Newark, N. J.

Montana State Board of Dental Examiners.

Annual dues payable January 1, but the law imposes the penalty only after May 1. Remittance should be made by some form of M. O. and the receipt carefully retained until dues receipt is received. Observance of



this rule will render it impossible for an error to escape detection. The Board absolutely refuses to be responsible for money claimed to be sent in open mail. Annual Meeting of the Board July 8, 9, 10, in Helena. Application blanks, which must be filled out and returned at least 20 days prior to the meeting, may be obtained of the Secretary.

Applicants for the examination must furnish their own material and instruments, including hand piece, for practical demonstration.

Written examinations include anatomy, physiology, chemistry, dental medicine, metallurgy, histology, operative, surgical, and mechanical dentistry.

D. J. WAIT, Secretary.

Helena, Montana.

Massachusetts Board of Registration in Dentistry.

A meeting of the Massachusetts Board of Registration in Dentistry, for the examination of candidates, will be held in Boston, Mass., March 6, 7, and 8, 1907.

Application blanks may be obtained from the Secretary.

DR. G. E. MITCHELL, Secretary.

Haverhill, Mass.

25 Merrimack Street.

New York State Dental Society.

The Thirty-ninth Annual Meeting of the Dental Society of the State of New York will be held in Albany, May 10 and 11, 1907, when essays will be presented by the following members of the profession: Dr. W. D. Miller, Berlin; Dr. A. H. Peck, Chicago; Dr. Charles McManus, Hartford; Dr. Clarence J. Grieves, Baltimore; Dr. G. V. I. Brown, Milwaukee; Dr. L. C. F. Hugo, Washington; Dr. Nelson T. Shields, New York; Dr. I. C. Curtis, Fulton; Dr. L. S. Goldsmith, New York, report correspondent; Dr. E. Howard Babcock, Brooklyn, report on Practice; Dr. Emanuel Muntz, Buffalo. Report on Scientific research.

A full list of clinics is being arranged and a complete programme will be announced later.

W. A. WHITE, President,
Phelps, N. Y.

CHARLES S. BUTLER, Secretary,
Buffalo.



New Jersey State Dental Society.

The New Jersey State Dental Society will convene in the Auditorium, Asbury Park, N. J., beginning Wednesday, July 17, and continue 18 and 19.

The exhibitors will please communicate with Dr. Walter Woolsey, Elizabeth, N. J. Clinicians communicate with Dr. Charles H. Dilts, Trenton, N. J. Essayists communicate with Dr. W. A. Jaquette, Salem, N. J.

CHARLES A. MEEKER, Secretary,
29 Fulton Street, Newark, N. J.

American Dental Society of Europe.

The American Dental Society of Europe will hold its next annual meeting in Rome, Italy, at Easter, 1907. A very cordial invitation is extended to members of the profession to be present. As it is the first meeting of the Society in the "Eternal City," it is hoped it may be the most enjoyable one in its history.

J. W. GALE, Hon. Sec'y,
79 Hohenzollern-Ring, Cologne (Rhine), Germany.

Detroit Dental Society Clinic and Banquet.

On February 16, 1907, will be celebrated the Twenty-fifth anniversary of the founding of the Detroit Dental Society.

A splendid programme has been arranged, including a clinic and banquet, and a lecture by Dr. C. N. Johnson, the guest of honor, on a subject in which all progressive men are interested—"Cavity Preparation for Inlays."

A very cordial invitation is extended to all reputable practitioners to attend this meeting.

GEORGE F. BURKE, Secretary.
315-317 Stevens Bldg., Detroit, Mich.



Psi Omega Dental Fraternity.

The Fifteenth Anniversary Dinner of Psi Omega Dental Fraternity, will be held Friday evening, February 15, 1907, at Hotel Manhattan, Forty-second Street, corner Madison Avenue, New York City, at 6.30 o'clock. A most cordial invitation is extended to all Psi Omegans in New York and vicinity.

LEROY S. EDWARDS, Secretary Banquet Committee.
140 Remsen Street, Brooklyn, N. Y.

Vermont State Dental Society.

The Thirty-first Annual Meeting of the Vermont State Dental Society will be held in Burlington, Vt., May 15, 16, and 17, 1907.

The Vermont Society has in the past held most successful meetings, and we have every reason to expect that this will surpass any previous one, as a very interesting programme has been prepared by the committee, and will be mailed in due time.

Vermont has the largest per cent. of membership in its State Society of any State in New England, and we hope to see every dentist in the State who is eligible a member.

THOMAS MOUND, Secretary.

Rutland, Vt.

San Francisco Dental Society.

At the regular meeting of the San Francisco Dental Society, the following named officers were elected for the ensuing year: President, Dr. H. A. Frederick; Vice-President, Dr. J. V. Levenger; Recording Secretary, Dr. L. C. Heller; Financial Secretary, Dr. F. J. Lane; Treasurer, Dr. W. A. L. Knowles; Librarian, Dr. M. A. Greenlaw.

L. C. HELLER, D.D.S, Secretary.